



## Chapter 4: Affected Environment

### 4.1 Traffic and Transportation

#### 4.1.1 Highway System

Existing US 31 is functionally classified as a principal arterial on the National Highway System (NHS). The NHS consists of about 155,000 miles of Interstate and principal arterial highways nationwide designated by the U.S. Congress as having national significance. US 31 is also designated a Statewide Mobility Corridor and Commerce Corridor in the INDOT 2000-2025 Long Range Plan.

Existing US 31 provides four through lanes in the corridor. There are approximately 480 private driveways, 20 cross road intersections, and 50 “T” road intersections along US 31 from US 30 to US 20. However, the character of the facility varies significantly along the 20-mile corridor with respect to the level of access control (frequency of drives or public road intersections), median width/type and shoulder treatment. The five-mile segment from US 30 to Michigan Road (Old US 31) is a four-lane facility with a depressed, 50-foot wide median and access limited to county public crossroads (i.e., partial access control). The remaining 15-mile segment from Michigan Road to US 20 has no median or a narrow median ranging from four feet to sixteen feet wide (sufficient only for a left-turn lane), and access is only controlled to adjacent property through driveway permits (i.e., no access control). Four traffic signals exist on this stretch of US 31 at US 6, SR 4, Kern Road and Johnson Road. A fifth traffic signal is programmed for installation at New Road on US 31. On-street parking is permitted along US 31 through Lakeville. Through the towns of LaPaz and Lakeville and the south side of South Bend, the land uses along existing US 31 include churches, cemeteries, historic structures, businesses, and homes.

Level of service (LOS) provides a measure of congestion on roadways (See Chapter 2 for a further explanation of LOS rating). Traffic flow conditions are rated LOS A to F, with LOS A indicating the least traffic congestion and LOS F reflecting the most traffic congestion. In the case of signalized and unsignalized intersections, the LOS is based on average delay per vehicle at the intersection. Based on INDOT reconstruction (4R) standards outlined in the Indiana Design Manual, the minimum acceptable LOS is C in rural and suburban areas (i.e., US 30 to Miller Road in the case of US 31) and D in urban intermediate and built-up areas (i.e., Miller Road to US 20 Bypass in the case of US 31).

Referring to Table 4.1.1, from US 30 to the south side of Lakeville, the average daily traffic (ADT) volumes on US 31 in the year 2000 range from 17,000 to 25,000 vehicles per day (vpd) with an LOS B or C in undeveloped areas, but an LOS E through LaPaz. From the south side of Lakeville to US 20, the ADT volumes in the year 2000 on US 31 range from 24,000 to 32,000 vpd with an LOS E in undeveloped areas and an LOS F in others areas (the developed segments along US 31 through Lakeville and from Roosevelt Road to US 20).

With historical traffic growth to the year 2030, daily traffic volumes will increase in the range of 40 to 50 percent over the year 2000. Future daily traffic volumes on US 31 will range from 23,500 at US 30 to 29,300 vpd on the south side of Lakeville, and will range from 34,400 to 46,000 vpd from the south side of Lakeville to the US 20 Bypass. This will result in an unacceptable LOS on US 31 for 15 miles of the US 31 corridor from the Michigan Road intersection to the US 20 Bypass interchange.

Table 4.1.1 also records the existing posted speed limits along the US 31 Corridor. As US 31 passes through the small communities of LaPaz and Lakeville, the posted speed limits are reduced to 35 mph due to more frequent private driveways and cross streets, on-street parking, and sidewalks used by pedestrians entering shops in the com-

# US 31 Plymouth to South Bend

## Draft Environmental Impact Statement



Table 4.1.1: Present and Future Levels-Of-Service of US 31 Segments<sup>1</sup>

Segments	Area Type	2000 Base Year			2030 Future Year		
		Daily Traffic	LOS	Posted Speed	Daily Traffic	LOS	Posted Speed
US 30 – Michigan Rd.	Rural	16,989	B	55 mph	23,500	C	55 mph
Michigan Rd – US 6	Rural	24,232	C	55 mph	35,200	E	55 mph
US 6 - Tyler Rd.	Rural	19,845	E	35 mph	28,200	F	35 mph
Tyler Rd. – Lake Trail	Rural	21,400	C	55 mph	29,300	D	55 mph
Lake Trail – SR 4	Rural	27,217	F	35 mph	40,300	F	35 mph
SR 4 – Miller Rd.	Rural	24,240	E	55 mph	34,400	F	55 mph
Miller Rd. – Roosevelt Rd.	Urban	26,419	E	55 mph	37,500	F	50 mph
Roosevelt Rd. – US 20	Urban	31,526	F	45 mph	46,000	F	45 mph

Note: Shading denotes failure to meet INDOT minimum design standards for LOS of C in rural areas and D in urban areas.

Table 4.1.2: Present and Future Levels-of-Service for US 31 Intersections

	Area Type	2002 Base Year		2030 Future Year	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Signalized Intersections					
US 6	Rural	E	F	F	F
SR 4	Rural	B	B	D	E
Kern Road	Urban	E	D	F	F
Johnson	Urban	E	D	F	F
Plymouth-Goshen Trail	Rural	C	C	D	E
W 5A Road	Rural	B	C	C	C
Tyler Road	Rural	E	D	F	F
New Road	Rural	E	F	F	F
Madison Road	Urban	C	C	F	F
Roosevelt Road	Urban	D	D	F	F
Note: Shading denotes failure to meet INDOT minimum design standards for LOS of C in rural areas and D in urban areas.					



mercial areas. It is anticipated that the speed limit may be reduced on US 31 from Roosevelt Road to Miller Road as urbanization extends down US 31.

As shown in Table 4.1.2, three of the four signalized intersections along the existing US 31 currently operate at an LOS E or F. For traffic entering US 31 at two-way stops, three of the six crossroads experienced an LOS below C, an indication of a lack of adequate gaps in the mainline traffic stream. With the historical growth in traffic to the year 2030, all presently signalized intersections will operate at an unacceptable LOS. For the six major two-way stop crossroads examined, five of the six crossroads will operate at an unacceptable LOS.

The origin and destination of traffic using the US 31 Corridor also demonstrates that US 31 handles traffic characteristic of a Statewide Mobility Corridor (e.g., long distance trips and longer distant commuter trips). Both at present and in the year 2030, the primary destination of trips at the north end of the corridor remains Michigan Street (Business US 31) for traffic entering South Bend. Figures 4.1.1 and 4.1.2 show traffic patterns on US 31 in the year 2000 at the US 30 interchange and US 20 Bypass interchange respectively. While traffic volumes to and from the west on the US 20 Bypass from US 31 are greater than the traffic volumes to and from the east on the US 20 Bypass from US 31 at present, significant growth in eastern St. Joseph County will result in traffic to and from the east on the US 20 Bypass being slightly higher than to and from the west in the year 2030. Examining the origin and destination of traffic throughout the 20-mile corridor reveals that slightly over half of the traffic in the corridor is through traffic (i.e., with both trips ends outside the corridor) – 10,630 vpd out of 20,850 vpd. Of this through traffic, most continues toward downtown South Bend in the Michigan Street (Business US 31) corridor, and the second greatest through traffic volume heads into Michigan on US 31. Figures 4.1.3 through 4.1.10 show the origin-destination of traffic for the entire corridor as well as the south end of the corridor, Lakeville and north end of the corridor.

### 4.1.2 Public Transportation

The Chicago, South Bend and South Shore Railroad provides commuter rail service from the Michiana Regional Airport in northwest South Bend to downtown Chicago, but averages only 100 passengers per day. Local bus transportation for South Bend and Mishawaka is provided by TRANSPO, the South Bend Public Transportation Corporation. TRANSPO provides a system of fifteen fixed routes radiating from downtown South Bend. Although TRANSPO does not provide bus service in the US 31 Corridor, it does have two routes that enter the US 31 Study Area. With 30-minute headways (time period between bus arrivals), Route 8 serves the Scottsdale Mall on the north side of the US 20 Bypass near Miami Highway, and Route 6 serves the residential area on the east side of Miami Highway immediately south of the US 20 Bypass. In Plymouth, Rock City Riders provides Section 18 transit services; however, such transit service is available to the elderly, handicapped and economically disadvantaged and not to the general public.

The bus ridership is characterized by a transit-dependent population. According to the 2000 Census, public transportation (including taxicab) was the means of transportation to work for only 1.2% of the work trips in St. Joseph County and 0.4% of the work trips in Marshall County. The percent of work trips by public transportation dropped by 29% between 1990 and 2000.

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<sup>1</sup> 2000 AADT generated by factoring 1998 INDOT counts by historic growth factors; Daily Vehicle Capacity developed from *Highway Capacity Manual*, Special Report 209; 2030 AADT produced by applying historic growth factors to 1998 counts.

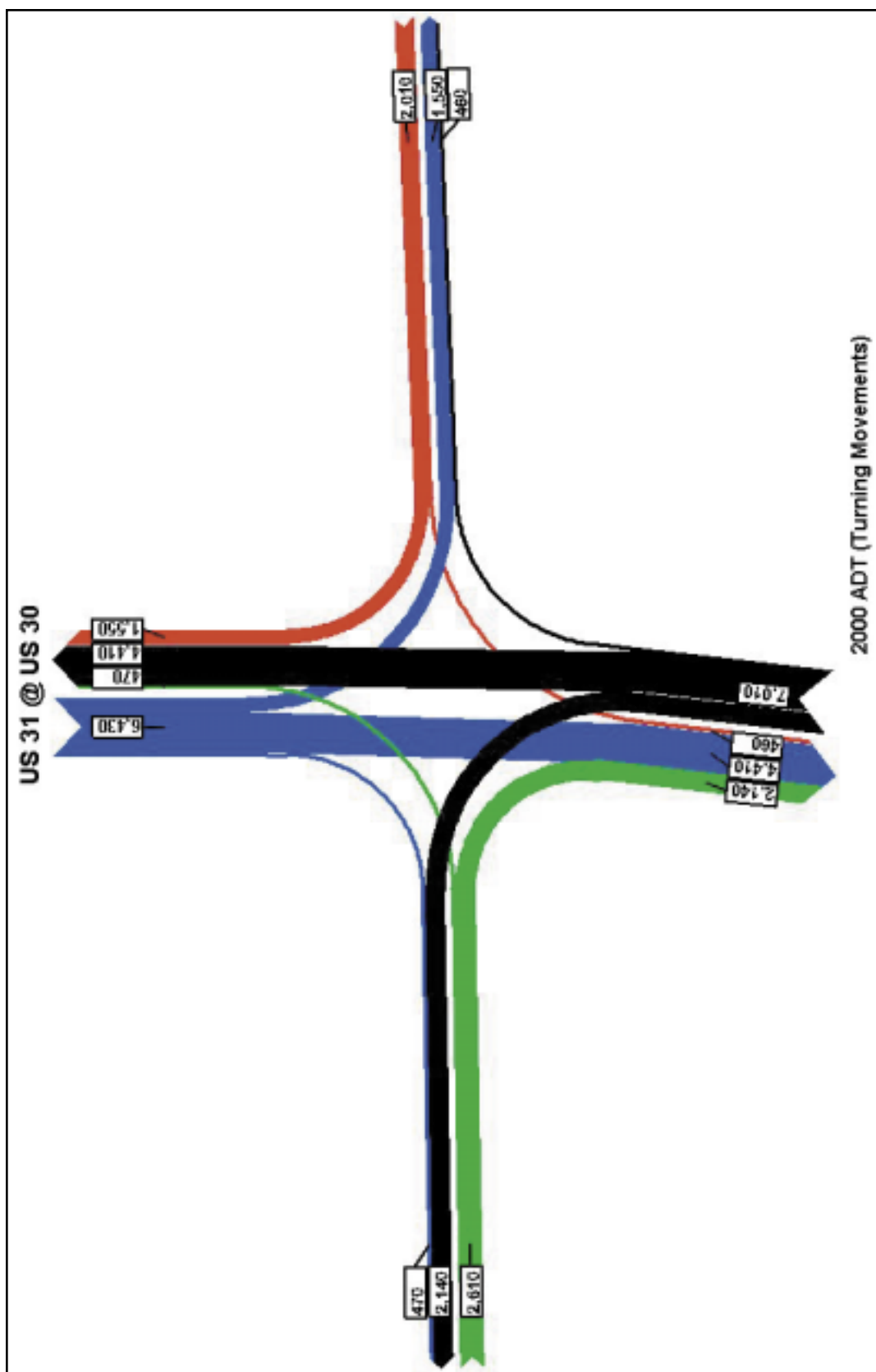


Figure 4.1.1: US 31 at US 30 Interchange Turning Movements (2000)

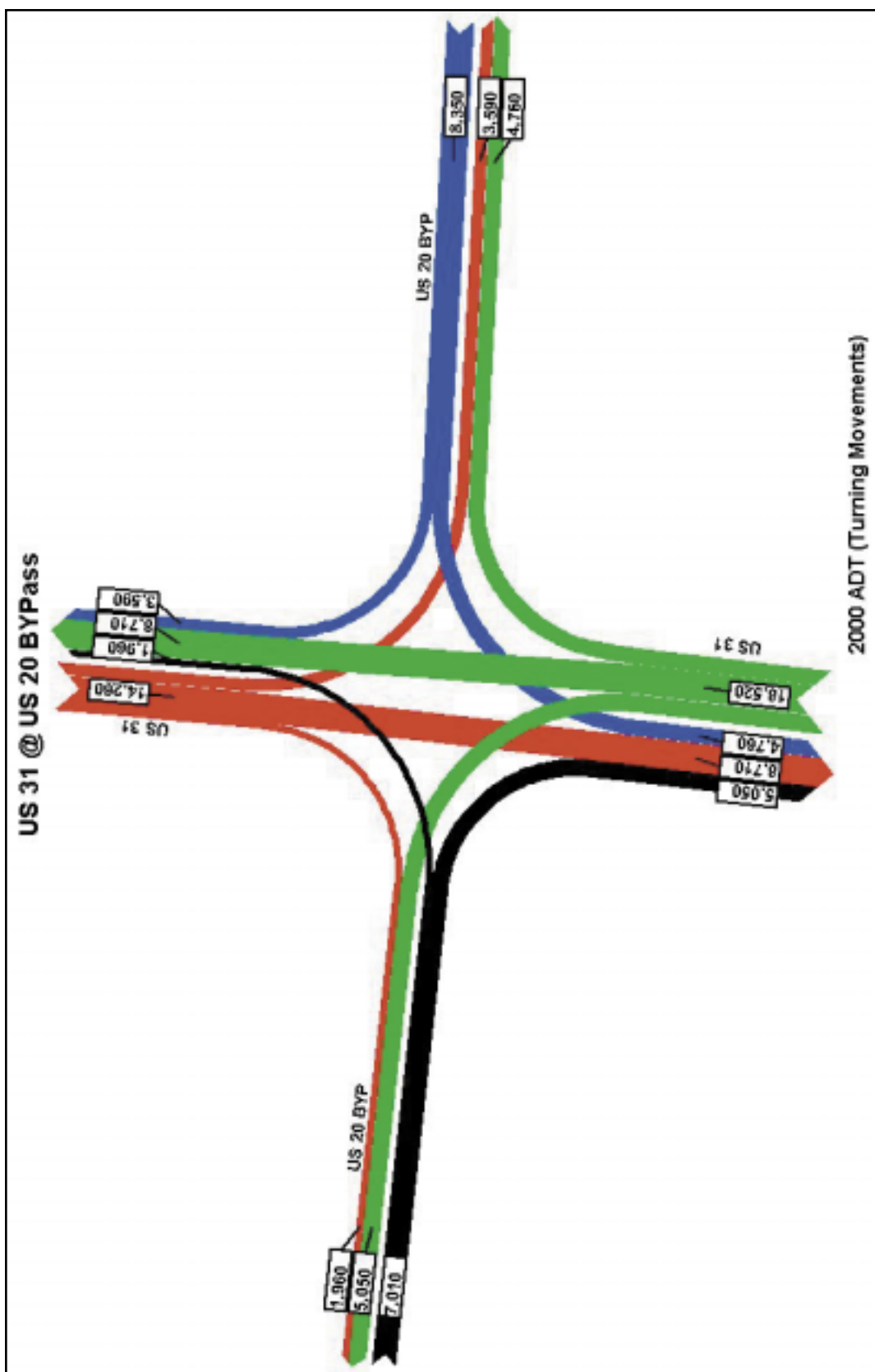


Figure 4.1.2: US 31 at US 20 Bypass Interchange Turning Movements (2000)

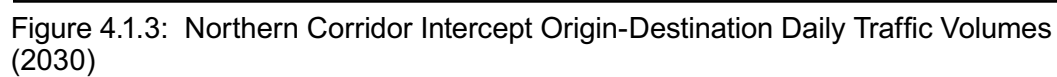








Figure 4.1.5: Southern Corridor Intercept Origin-Destination Daily Traffic Volumes (2030)



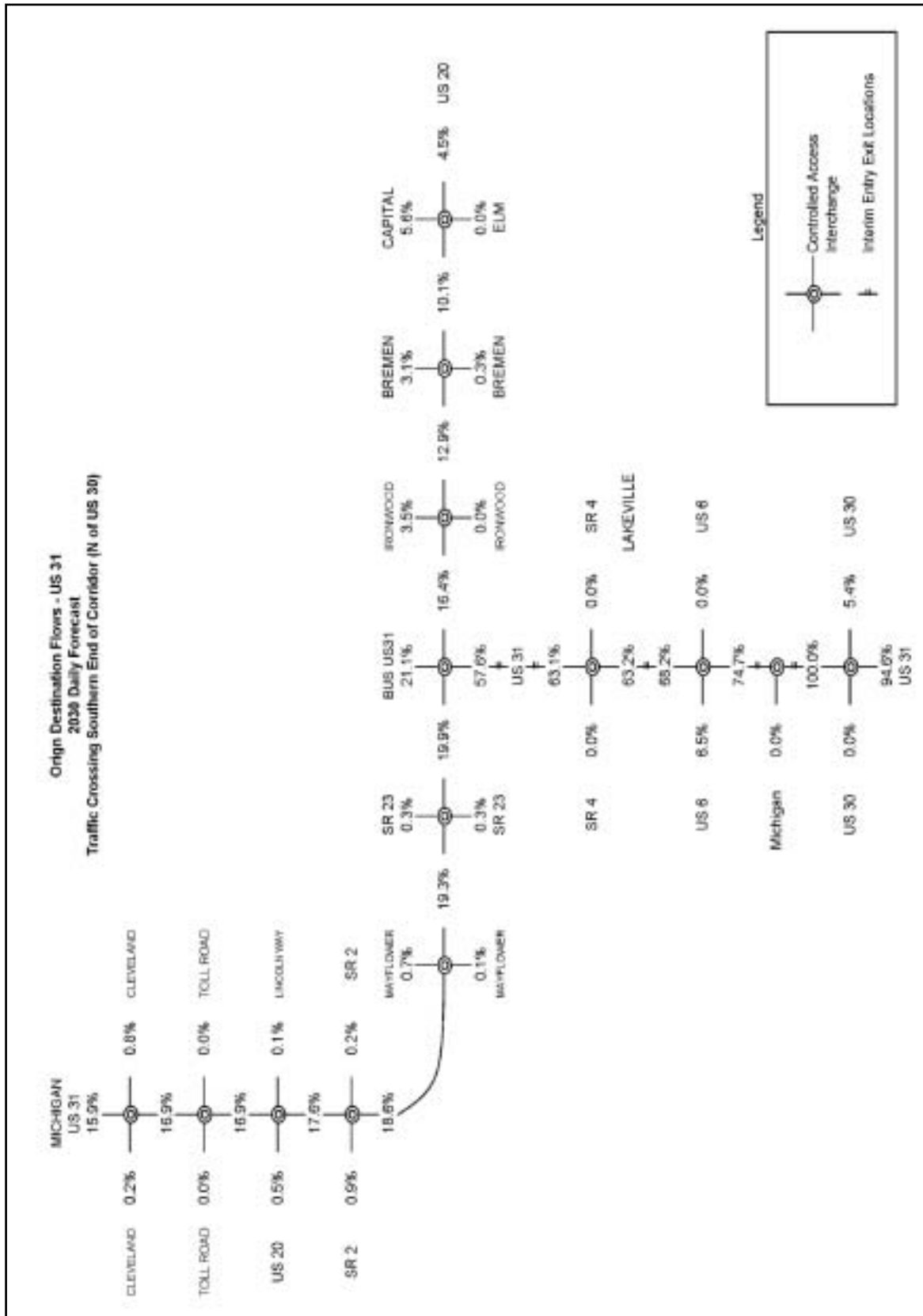


Figure 4.1.6: Southern Corridor Intercept Origin-Destination Percent Daily Traffic Volumes (2030)



Figure 4.1.7: Lakeville Intercept Origin-Destination Daily Traffic Volumes (2030)

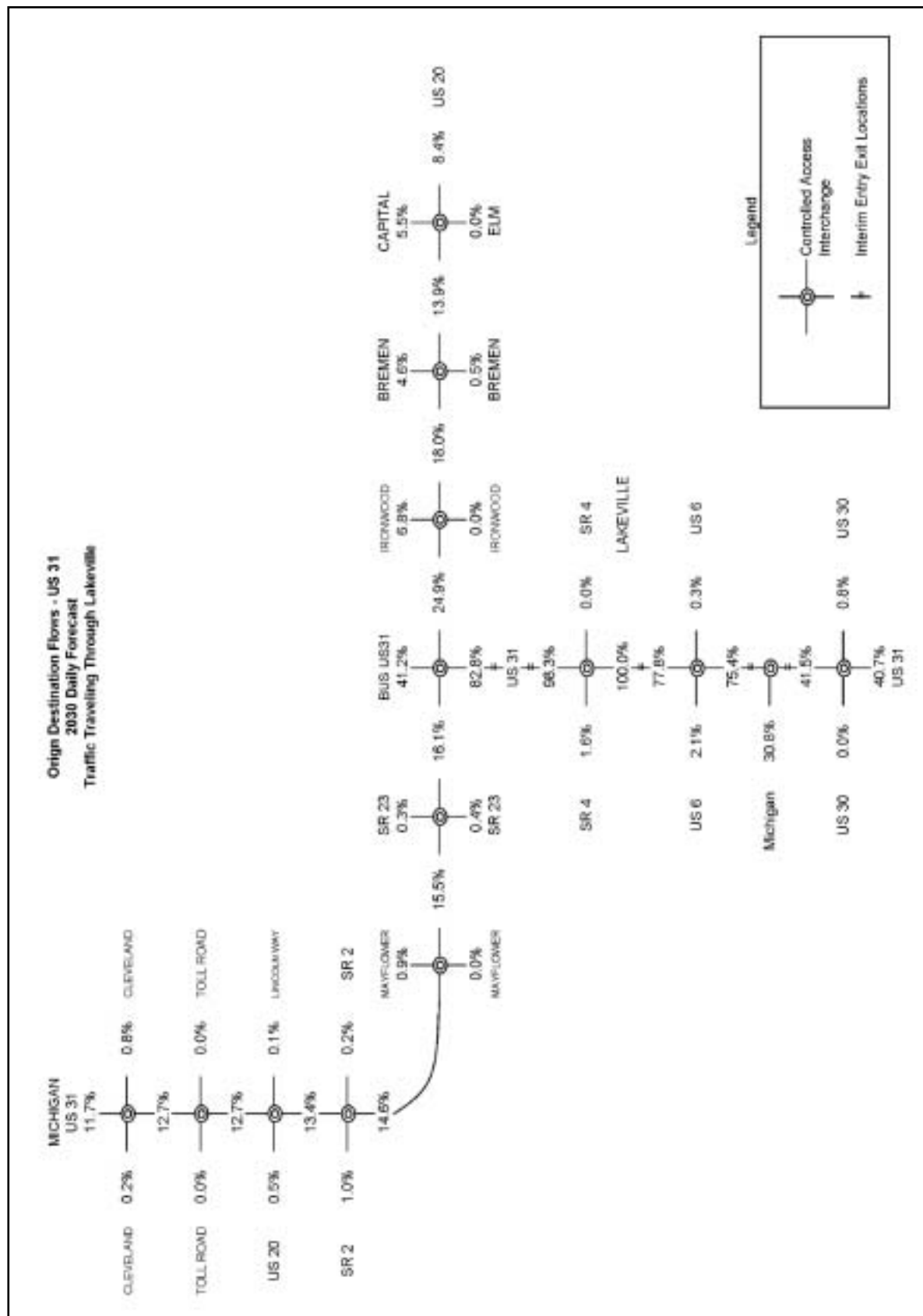


Figure 4.1.8: Lakeville Intercept Origin-Destination Percent Daily Traffic Volumes (2030)



Figure 4.1.9: Entire US 31 Corridor Origin-Destination Daily Traffic Volumes (2030)

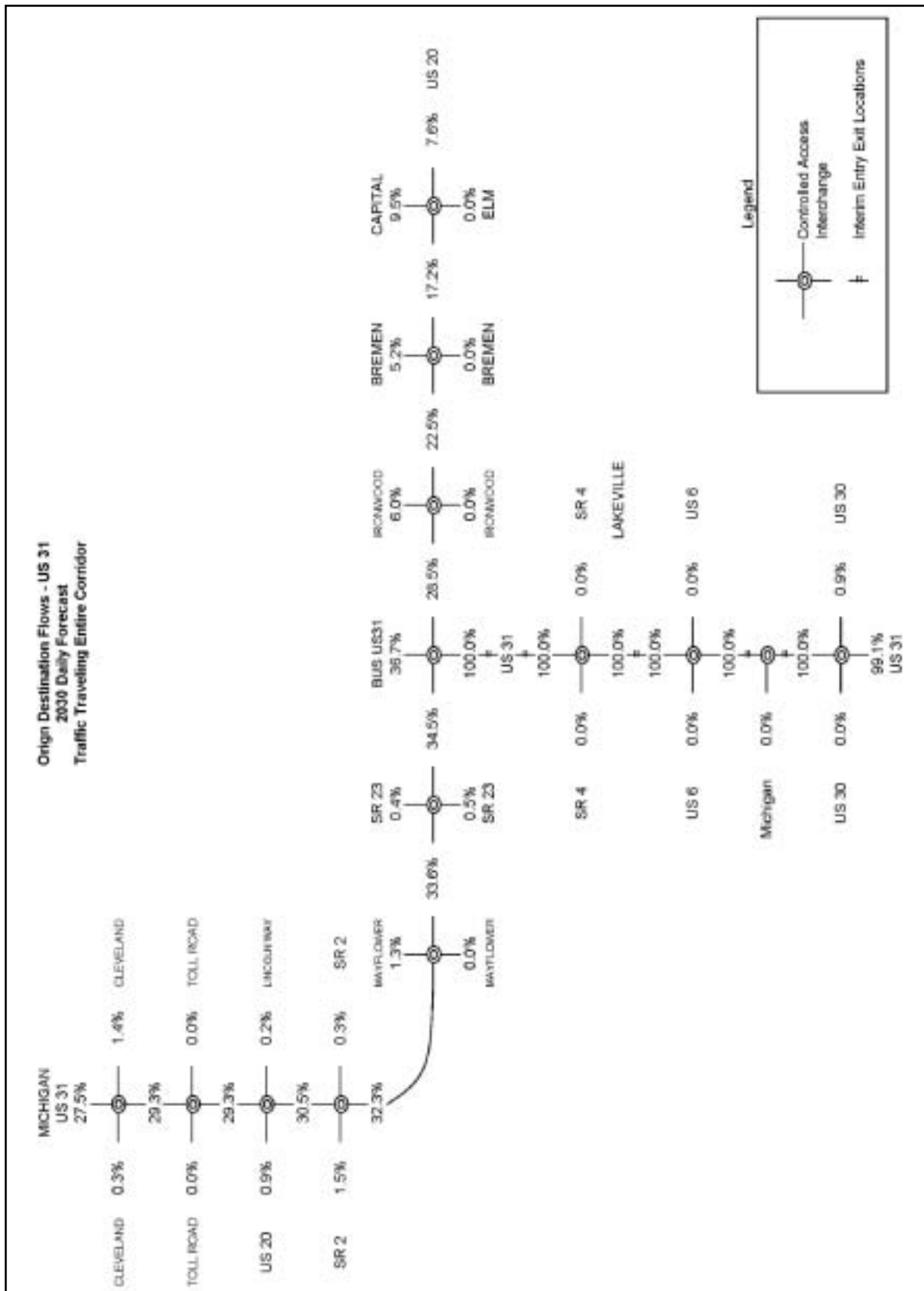


Figure 4.1.10: Entire US 31 Corridor Origin-Destination Percent Daily Traffic Volumes (2030)



## 4.2 Pedestrian and Bicyclist Access

Bicyclist and pedestrian trails can be found throughout Indiana in state parks, and along roadways and abandoned rail lines. These trails provide people access to Indiana's outdoor, scenic areas and wildlife. Existing US 31 does not have any special accommodations for bicycle or pedestrian traffic, and does not cross any existing bicycle or pedestrian paths within the study area.

Within St. Joseph County, there is the South Bend North Side Boulevard trail, the East Bank Walkway, Lasalle Blue-stem Trail, and the Darden Road Bicycle and Pedestrian path, which is currently under construction in South Bend. There is also a plethora of other proposed trails in and around the city of South Bend and St. Joseph County. One of the proposed trails is the South Bend/Dillon Trail, which would be part of the Hoosier Rails-to-Trails system. This trail would serve as a link between South Bend and Potato Creek State Park, and from there it would travel through the Kankakee River valley to the Kingsberry Fish and Wildlife Area in Laporte County.

In Marshall County, there are currently four signed bike trails located southwest of Plymouth. These trails are on existing roadways and range in length from 16 miles to 63 miles and are also associated with an annual bike ride called the Blue Berry Bicycle Cruise, which is held every Labor Day weekend.

## 4.3 Socio-economic Environment

In the year 2000, the combined metropolitan areas of South Bend and Elkhart-Goshen ranked fourth in population and employment in the State of Indiana behind Indianapolis, Gary and Ft. Wayne metropolitan areas. After two decades of modest population and employment growth from 1970 through 1990, the rate of population and employment growth for St. Joseph County in the decade of the 1990s outpaced that of the State of Indiana, and is forecast to out perform the State of Indiana to the year 2030. Since 1970, Marshall County has outpaced the growth of the State of Indiana in population and employment, and this pace is forecast to continue to the year 2030.

### 4.3.1 Demographic Trends

The entire region served by US 31 is experiencing considerable growth. The three-county area of Marshall, St. Joseph, and Elkhart counties added more than 48,000 people and 43,000 jobs over the past decade. (See Table 4.3.3) The Indiana counties containing the South Bend-Mishawaka/Elkhart-Goshen metropolitan area (St. Joseph and Elkhart counties) experienced higher population growth (13.6%) than Indiana as a whole (9.7%), and the City of Plymouth in Marshall County grew at nearly double the state's rate (18.5% versus 9.7%).<sup>2</sup>

Socioeconomic forecasts predict a strong growth trend (although at a slower rate) continuing in future years with the three-county area adding more than 97,210 people by the year 2030. This includes an increase of 46,000 people (17.3%) in St. Joseph County, 11,210 people (24.8%) in Marshall County, and 40,000 people (21.9%) in Elkhart County. These unique county population forecasts were developed from employment forecasts based on 30-year trend regression analysis of total employment as well as the ten major business sectors, labor forecasts based on 30-year trend regression analysis, labor force participation ratio trends shift-share relationships at the state and national level, and a population cohort survival-net migration model. Before the recommended county forecasts were chosen, they were compared to those of the Indiana State Data Center, Regional Economic Models, Inc., and Woods & Poole Economics, Inc.

Tables 4.3.4 and 4.3.5 summarize the demographic trends and forecasts for variables used in the development of the US 31 Improvement Project Travel Development Model used to replicate existing travel patterns and to forecast future daily traffic volumes. Relative to median household income, St. Joseph County and Marshall County values were very close to the Indiana household median income of \$41,567 in the year 2000.



Using the countywide forecast control totals (Tables 4.3.4 and 4.3.5), population was allocated to Travel Analysis Zones (subunits of Census Tracts) in St. Joseph and Marshall County based on a variety considerations:

- 30-year household growth trends by Census Tract
- New residential permits by jurisdiction over the past 20 years
- The 2002 Real Estate Market Study by CB Richard Ellis, Inc.
- New residential subdivisions from the New Homes Magazine (June 2003)
- Comprehensive Plan for South Bend and St. Joseph County, Indiana (April 2002) for geographic areas of housing loss and growth
- MACOG 2025 Transportation Plan (1999) future growth map
- Vacant land area from 1998-1999 aerial photography
- Consistency with household densities in surrounding fully developed geographic areas
- Sustaining the 30-year historical residential growth rates for outlying towns such as Lakeville, New Carlisle, North Liberty, Walkerton in St. Joseph County and Argos, Bremen, Bourbon, Culver and LaPaz in Marshall County

Table 4.3.3: Regional Population Growth

	1970	1980	1990	2000	2030	% growth 2000-2030
St. Joseph County	244,827	241,617	247,052	265,559	311,560	17.3%
Marshall County	34,986	39,155	42,182	45,128	56,340	24.8%
Elkhart County	126,529	137,330	156,198	182,791	222,790	21.9%
Two County Area	279,813	280,772	289,234	310,687	367,900	18.4%
Three County Area	406,342	418,102	445,432	493,478	590,690	19.7%
Indiana	5,195,392	5,490,224	5,544,159	6,080,485	6,636,330	9.1%
United States	203,302,000	226,546,000	248,710,000	281,422,000	348,240,000	23.7%

Source: Historic population data is taken from U.S. Bureau of the Census; 2030 county population by Bernardin-Lochmueller & Associates; Indiana 2030 population based on Indiana State Data Center projections (1998 series); national 2030 population from Woods & Poole Economics, Inc. (2000 Edition).

<sup>2</sup> Historic population data is taken from U.S. Bureau of the Census; historic employment data is taken from the Indiana Department of Workforce Development for Indiana and counties from the US Bureau of Labor Statistics for the nation.




**Table 4.3.4: Summary of Demographic Control Totals for St. Joseph County**

Variable	1990 <sup>a</sup>	1995 <sup>a</sup>	2000 <sup>a</sup>	2005 <sup>b</sup>	2010 <sup>b</sup>	2015 <sup>b</sup>	2020 <sup>b</sup>	2025 <sup>b</sup>	2030 <sup>b</sup>
Labor Force	124,680	137,810	134,770	139,751	144,603	149,455	154,308	159,160	164,012
Total Population	247,052	256,466	265,559	273,177	279,980	286,142	294,306	302,933	311,560
Group Quarters	12,161	12,788	13,414	14,000	14,600	15,200	15,800	16,400	17,000
Household Population	234,894	243,520	252,145	259,177	265,380	270,942	278,506	286,533	294,560
Households (occupied units)	92,365	96,554	100,743	104,507	108,762	111,960	116,530	120,392	124,287
Household Size	2.54	2.52	2.5	2.48	2.44	2.42	2.39	2.38	2.37
Median Household Income (year 2000 dollars)	\$37,200	\$39,211	\$40,420	\$41,179	\$41,657	\$42,346	\$42,345	\$42,452	\$42,559
Total Vehicles	188,688	214,965	235,937	247,888	263,326	279,312	295,448	311,624	327,800
Personal (Household) Vehicles	153,375	176,686	196,066	208,248	223,609	239,720	256,251	273,111	289,971

Sources:

(a) US Bureau of the Census for 1990-2000 population and housing; and Indiana Business Research Center for median household income and motor vehicle registration with the State of Indiana Bureau of Motor Vehicles.

(b) INDOT Projections

**Table 4.3.5: Summary of Demographic Control Totals for Marshall County**

Variable	1990a	1995a	2000a	2005b	2010b	2015b	2020b	2025b	2030b
Labor Force	22,270	26,540	24,180	25,416	26,572	27,588	28,590	29,591	30,592
Total Population	42,182	44,648	45,128	46,972	48,474	50,237	52,284	54,312	56,340
Group Quarters	652	667	681	700	700	700	700	700	700
Household Population	41,530	43,981	44,447	46,272	47,774	49,537	51,584	53,612	55,640
Households (occupied units)	15,146	16,110	16,519	17,395	18,304	19,200	20,309	21,275	22,241
Household Size	2.74	2.73	2.69	2.66	2.61	2.58	2.54	2.52	2.50
Median Household Income (year 2000 dollars)	\$37,300	\$40,366	\$42,581	\$45,032	\$46,533	\$47,917	\$48,655	\$49,641	\$50,621
Total Vehicles	38,545	42,945	47,600	49,331	52,682	56,032	59,383	62,734	66,085
Personal (Household) Vehicles	29,137	32,860	36,862	38,658	41,770	44,945	48,181	51,480	54,779

Sources:

(a) US Bureau of the Census for 1990-2000 population and housing; and Indiana Business Research Center for median household income and motor vehicle registration with the State of Indiana Bureau of Motor Vehicles.

(b) INDOT Projections



Within the immediate US 31 corridor from US 30 to the US 20 Bypass between Oak Road and Ironwood Road, population grows from 17,224 persons in the year 2000 to 23,403 persons in the year 2030, about a 36% increase in population over 30 years.

Within the US 31 corridor, different population growth trends result:

- In the growing commercial area north of the US 20 Bypass to Ireland Road from Locust Road on the west to Ironwood Road, population drops from 713 persons in the year 2000 to 681 persons in the year 2030 -- a 4% loss
- On the rapidly growing suburban fringe between Roosevelt Road and the US 20 Bypass from Locust Road to Ironwood Road, population increases from 9,444 persons in the year 2000 to 13,958 persons in the year 2030 when the area is completely developed -- a 48% increase
- In the ex-urban communities of Lakeville and LaPaz (generally defined by the Michigan Road/US 31 intersection on the south to Roosevelt Road on the north and from Oak Road on the west to Miami Highway/Linden Road on the east), population increases from 6,446 persons in the year 2000 to 8,159 persons in the year 2030 – a 27% increase
- In the rural area near Plymouth from US 30 to the Michigan Road/US 31 intersection between Michigan Road and Linden Road, population will drop from 1,334 persons in the year 2000 to 1,286 persons in the year 2030 if no major subdivisions occur on the north edge of Plymouth – a 4% loss

### 4.3.2 Employment Trends

Table 4.3.6 shows historic and projected employment growth based on an analysis of thirty-year trends for total employment as well as the ten major employment sectors. Before the recommended county forecasts were chosen, they were compared to county, state, and national forecasts prepared by Regional Economic Models, Inc., Woods & Poole Economics, and the US Bureau of Economic Analysis. Employment forecasts predict a strong growth trend (although at a slower rate) continuing in future years with the three-county area adding more than 63,990 jobs by the year 2030. This growth includes 33,720 jobs (23.3%) in St. Joseph County, 4,750 jobs (23.6%) in Marshall County, and 25,520 jobs (20.9%) in Elkhart County.

Table 4.3.6: Regional Employment Growth (wage and salary)*					
	1980	1990	2000	2030	% growth 2000-2030
St. Joseph County	93,932	111,589	128,178	161,900	23.3%
Marshall County	12,200	17,140	20,150	24,900	23.6%
Elkhart County	64,378	98,243	122,083	147,600	20.9%
Two County Area	106,132	128,729	148,328	186,800	25.9%
Three County Area	170,510	226,972	270,411	334,400	23.7%
Indiana	1,937,449	2,400,902	2,891,701	3,425,500	18.5%
United States	90,406,000	109,403,000	131,759,000	162,431,000	23.3%
Source: Historic “wage and salary” employment data from Indiana Department of Workforce Development; 2030 employment by Bernardin-Lochmueller & Associates; Indiana and national 2030 employment from Regional Economic Models, Inc. Note: * “wage and salary” employment excludes farm, sole proprietorship and federal employment.					



Tables 4.3.7 and 4.3.8 summarize the employment forecasts by major business sector used in the development of the US 31 Improvement Project Travel Development Model used to replicate existing travel patterns and to forecast future daily traffic volumes. While the Manufacturing Sector remains that second largest employment sector over the 30-year period, it experiences no growth in St. Joseph County.

Using the countywide forecast control totals (Tables 4.3.7 and 4.3.8), employment was allocated to Travel Analysis Zones (subunits of Census Tracts) in St. Joseph and Marshall counties based on a variety considerations:

- The 2002 Real Estate Market Study by CB Richard Ellis, Inc.
- Comprehensive Plan for South Bend and St. Joseph County, Indiana (April 2002) for commercial and industrial growth areas
- MACOG 2025 Transportation Plan (1999) future growth map
- Industrial Parks Director of St. Joseph County (January 2002 with Blackthorn update)
- Vacant land area from 1998-1999 aerial photography
- Consistency with surrounding employment densities
- Sustaining the historical portion of county employment for outlying towns such as Lakeville, New Carlisle, North Liberty, Walkerton in St. Joseph County and Argos, Bremen, Bourbon, Culver and LaPaz in Marshall County

Variable	1990a	1995a	2000a	2005b	2010b	2015b	2020b	2025b	2030b
Retail Employment	23,039	25,545	25,610	28,307	29,721	30,489	30,634	30,781	30,928
Non-retail Employment	88,550	97,289	102,568	111,745	118,411	123,132	125,780	128,379	130,978
Mining	0	0	0	0	0	0	0	0	0
Construction	5,732	6,327	7,288	7,799	8,109	8,229	8,198	8,169	8,140
Manufacturing	21,593	23,288	21,693	22,160	22,257	22,112	21,656	21,210	20,764
Transportation / Public Utilities	5,502	5,246	4,670	5,450	5,755	5,925	5,956	5,983	6,010
Wholesale	7,110	7,580	8,606	9,327	9,866	10,127	10,125	10,125	10,125
Finance / Insurance / Real Estate	6,271	6,238	6,430	7,010	7,399	7,602	7,631	7,654	7,677
Services	32,380	37,350	41,886	47,521	52,098	55,980	59,076	62,121	65,164
Government	9,962	11,260	11,995	12,478	12,927	13,158	13,136	13,117	13,098
Total Employment	111,589	122,834	128,178	140,053	148,131	153,621	156,414	159,160	161,906
Sources:									
(a) Indiana Department of Workforce Development for labor force and "wage and salary" employment									
(b) INDOT Projections									



Table 4.3.8: Summary of Forecast Control Totals for Marshall County

Variable	1990a	1995a	2000a	2005b	2010b	2015b	2020b	2025b	2030b
Retail Employment	2,746	3,230	3,134	3,184	3,468	3,589	3,598	3,587	3,585
Non-retail Employment	14,394	17,266	17,016	18,408	19,287	20,004	20,431	20,871	21,311
Mining	0	0	0	0	0	0	0	0	0
Construction	554	509	610	651	718	749	754	756	758
Manufacturing	7,225	9,014	8,522	9,415	9,184	9,300	9,531	9,867	10,202
Transportation / Public Utilities	716	711	717	762	846	883	888	888	888
Wholesale	464	588	624	628	688	717	723	720	717
Finance / Insurance / Real Estate	642	588	576	603	667	696	701	701	701
Services	3,137	3,935	3,867	4,220	4,844	5,211	5,361	5,471	5,581
Government	1,656	1,921	2,100	2,128	2,341	2,448	2,472	2,468	2,464
Total Employment	17,140	20,496	20,150	21,592	22,755	23,593	24,029	24,458	24,896
Sources: (a) Indiana Department of Workforce Development for labor force and “wage and salary” employment (b) INDOT Projections									

Within the immediate US 31 corridor from US 30 to the US 20 Bypass between Oak Road and Ironwood Road, employment grows from 5,144 jobs in the year 2000 to 6,139 jobs in the year 2030, about a 19% increase in jobs over 30 years.

Within the US 31 corridor, different employment growth trends result:

- In the growing commercial area north of the US 20 Bypass to Ireland Road from Locust Road on the west to Ironwood Road, employment increases from 207 jobs in the year 2000 to 5,007 jobs in the year 2030
- On the rapidly growing suburban fringe between Roosevelt Road and the US 20 Bypass from Locust Road to Ironwood Road, jobs increase from 2,840 jobs in the year 2000 to 13,958 persons in the year 2030 when the area is completely developed -- an 11% increase
- In the ex-urban communities of Lakeville and LaPaz (generally defined by the Michigan Road/US 31 intersection on the south to Roosevelt Road on the north and from Oak Road on the west to Miami Highway/ Linden Road on the east), employment increases from 1,771 jobs in the year 2000 to 2,417 jobs in the year 2030 – a 36% increase
- In the rural area near Plymouth from US 30 to the Michigan Road/US 31 intersection between Michigan Road and Linden Road, employment increases from 533 jobs in the year 2000 to 568 jobs in the year 2030 if no major business development occurs on the north edge of Plymouth – a 7% increase



### 4.3.3 Land Use/Zoning

The US 31 Plymouth to South Bend project is within Marshall and St. Joseph counties. The land use development in the unincorporated areas of Marshall County is guided by the Marshall County Zoning Ordinance. The Marshall County Zoning Ordinance covers LaPaz but does not cover Plymouth. The land use development in the city of Plymouth is guided by the Plymouth Zoning Ordinance which is administered by the Plymouth Plan Commission. Both Marshall County and the city of Plymouth are in the process of updating their comprehensive plans. The Marshall County Comprehensive Plan would update the 1974 Comprehensive Plan while the 2003 Plymouth Comprehensive Plan would update the 1976 Comprehensive Plan.

The land use development in St. Joseph County and in South Bend is guided by the St. Joseph County Zoning Ordinance. The St. Joseph County Area Plan Commission administers the zoning ordinance. The zoning ordinance also covers Lakeville. The 2002 St. Joseph County/South Bend Comprehensive Plan was recently adopted by both the St. Joseph County Council and the South Bend Common Council. However, the plan focuses primarily on the unincorporated portions of St. Joseph County. The City of South Bend is currently developing the City Plan, which will define development in South Bend into the future. According to the Division of Community Development for City of South Bend,

“The 2002 St. Joseph County/South Bend Comprehensive Plan only established a broad framework for county-wide resources and development patterns. The City Plan will help identify where South Bend is right now, where it wants to be in the future, and how it can get there.”

According to the Marshall County Zoning Map (see Figure 4.3.11), much of the area along US 31 from the edge of the Plymouth City Jurisdiction Boundary to the County Line is zoned Interchange Development District (B-2). This area includes land between West 6A Road and West 5A Road, land around West 4A Road, land around the existing interchange of US 31 and Michigan Road, and land around the intersection of US 31 and US 6 south of LaPaz. The Zoning Map also shows land zoned for Suburban Residential (S-1) district along Michigan Road and around LaPaz.

The Current Land Use map from the 2003 Plymouth Comprehensive Plan (see Figure 4.3.12) shows the area along US 31 from US 30 to the Plymouth City Jurisdiction Boundary as agriculture.

Figures 4.3.13, 4.3.14, and 4.3.15 are the future land use maps for Plymouth, LaPaz, and the unincorporated sections of Marshall County. Along US 31, the Plymouth future land use map (Figure 4.3.13) shows business park, institutional, and agricultural land uses. The business park is shown to be on the west side of US 31 between the Yellow River and West 7B Road. The institutional land use is possible additional land for the Plymouth Municipal Airport located off Michigan Road. The future land use for LaPaz is a mix of corridor commercial, traditional residential and agricultural conservation. The future land use for the unincorporated section of Marshall County along US 31 is agricultural.

According to the St. Joseph County Zoning Map (see Figure 4.3.16), the predominant zoning on either side of US 31 from the County Line to US 20 is agricultural (A) and residential (R) with some commercial (C) and manufacturing (M) right along US 31. For the town of Lakeville, the zoning map, shown as Figure 4.3.17, includes low density residential (R8), medium density residential (R12), general commercial (C), and limited industrial (LI).

The Future Land Use Plan from the 2002 St. Joseph County/South Bend Comprehensive Plan (see Figure 4.3.18) shows two residential growth areas along US 31; one in Lakeville and the other area is between US 20 and Kern Road. South of Kern Road to south of Roosevelt Road is a commercial growth area reserve. The 2002 St. Joseph County/South Bend Comprehensive Plan states that:



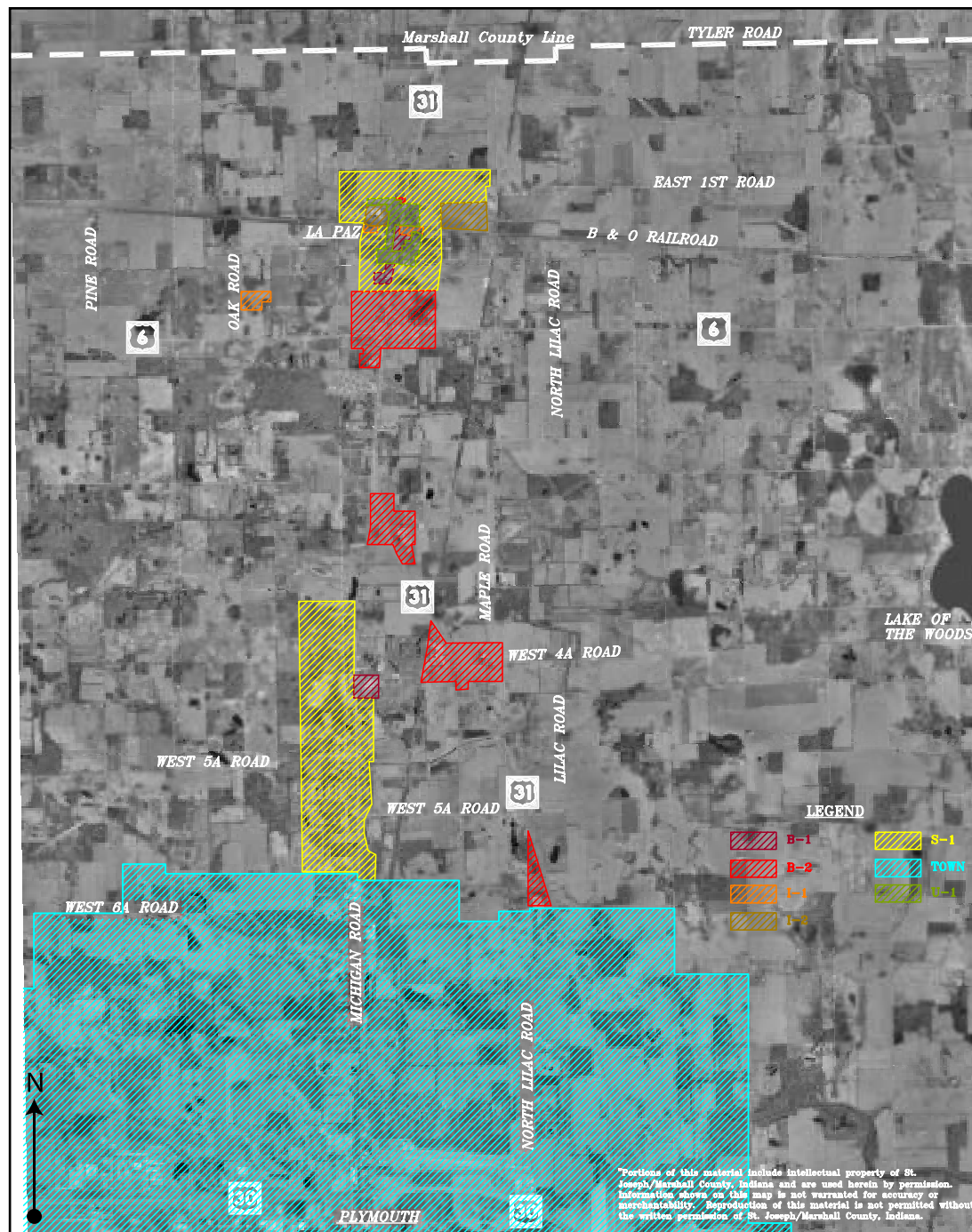


Figure 4.3.11: Marshall County Zoning Map

"The plan has several areas of focus for residential growth. The residential growth has three facets, the first being new growth focused on the northwestern and southern parts of the City of South Bend, infill growth in the northeastern part of the county, and rural growth in some of the smaller towns and communities throughout the county."

Figure 4.3.19 is a series of historical aerials showing land use development along US 31 between Roosevelt Road and Chippewa Avenue. The aerials span a time from 1938-39 to 2002. The aerials show the area as steadily growing over the 60 plus years.

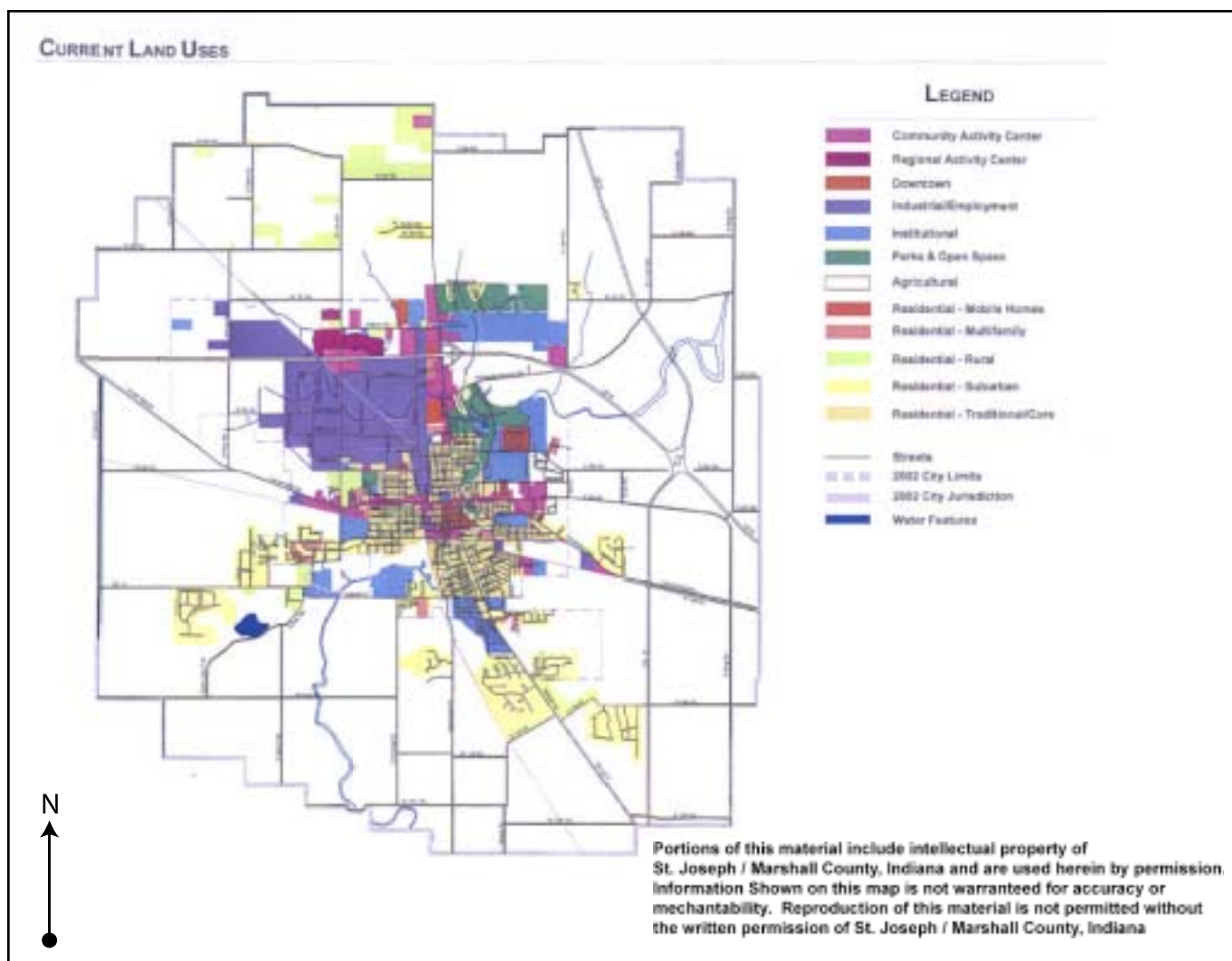


Figure 4.3.12: Plymouth Current Land Use Map

### 4.3.4 Neighborhoods and Community Cohesion

#### 4.3.4.1 Neighborhoods

Much of the project area is rural in nature with scattered residences along the county roads. Subdivisions become more prevalent on the north end of the project area as the various alignments approach the South Bend area. The following subdivided neighborhoods and incorporated towns have been identified in the immediate vicinity of the alignments and are shown on the aerial sheets in the appendix.

- *LaPaz incorporated area* – This town has a population of 562 and is located along both sides of US 31 in northern Marshall County, approximately eight miles north of Plymouth
- *Meadow Lane Subdivision* – This is a small subdivision (10 homes) located on the south side of US 6 approximately 3000 feet east of US 31. These homes appear to be 20 to 40 years old
- *Lakeville incorporated area* – This town has a population of 567 and is located along both sides of existing US 31 in southern St. Joseph County (Union Township)



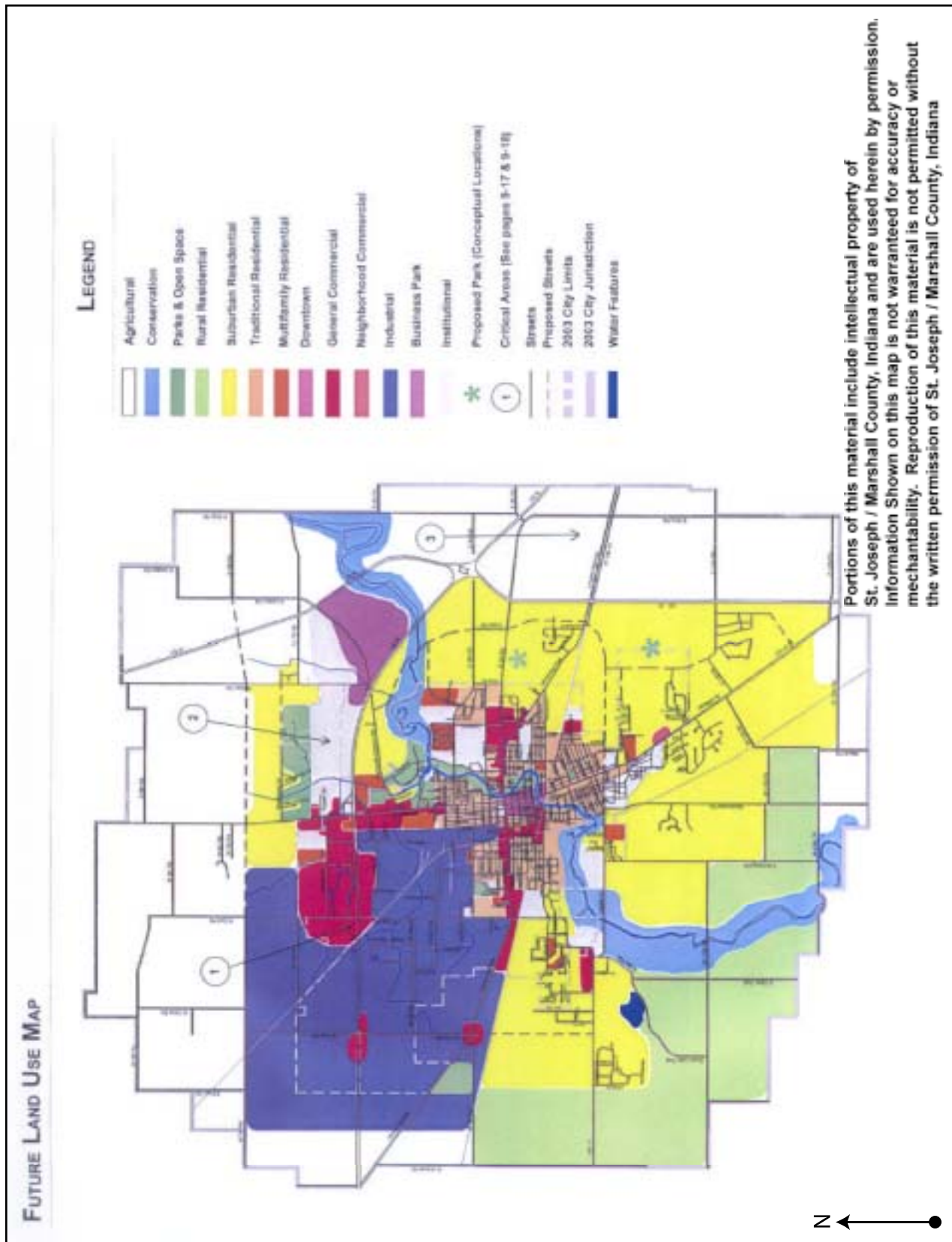


Figure 4.3.13: Plymouth Future Land Use Map

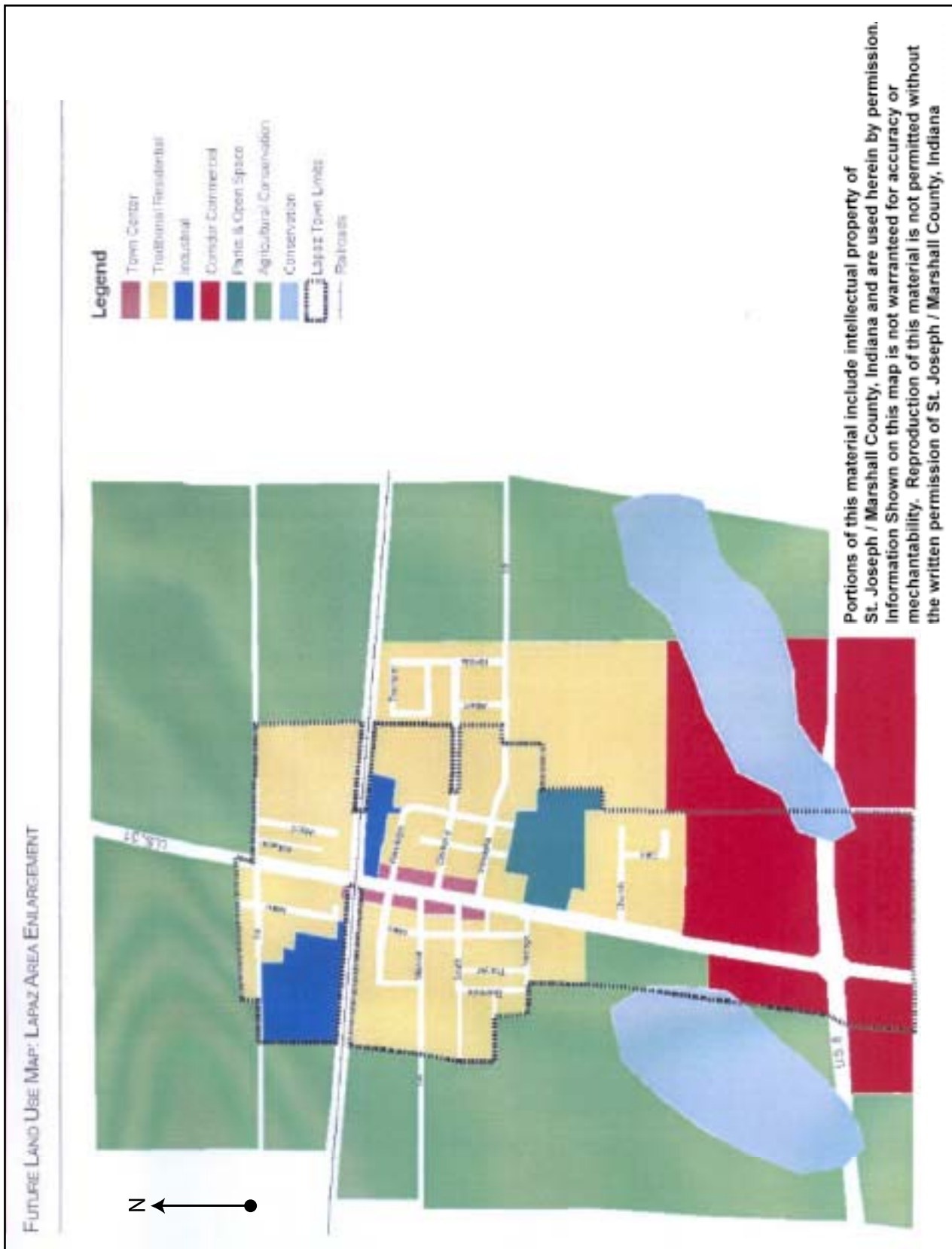


Figure 4.3.14: LaPaz Future Land Use Map

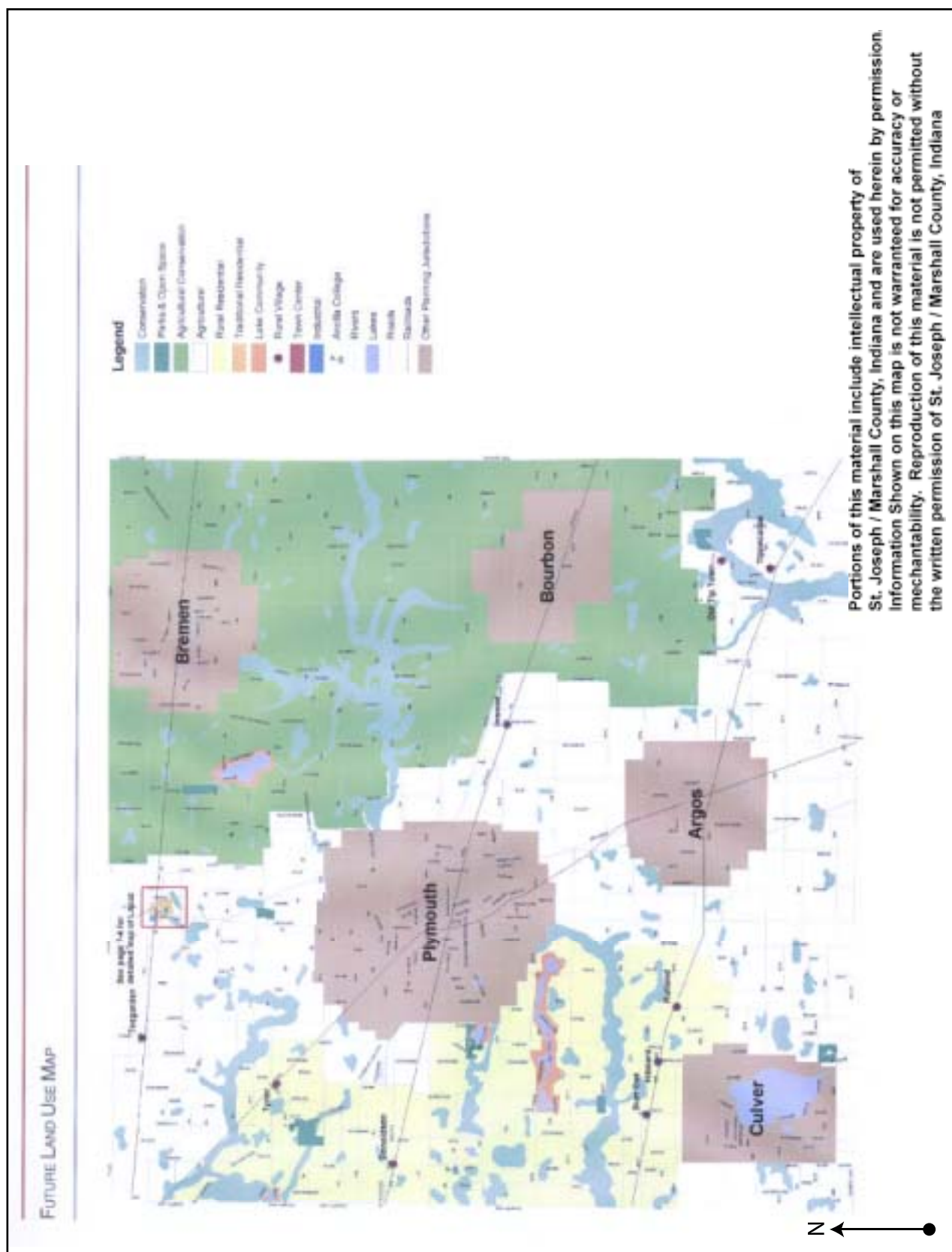
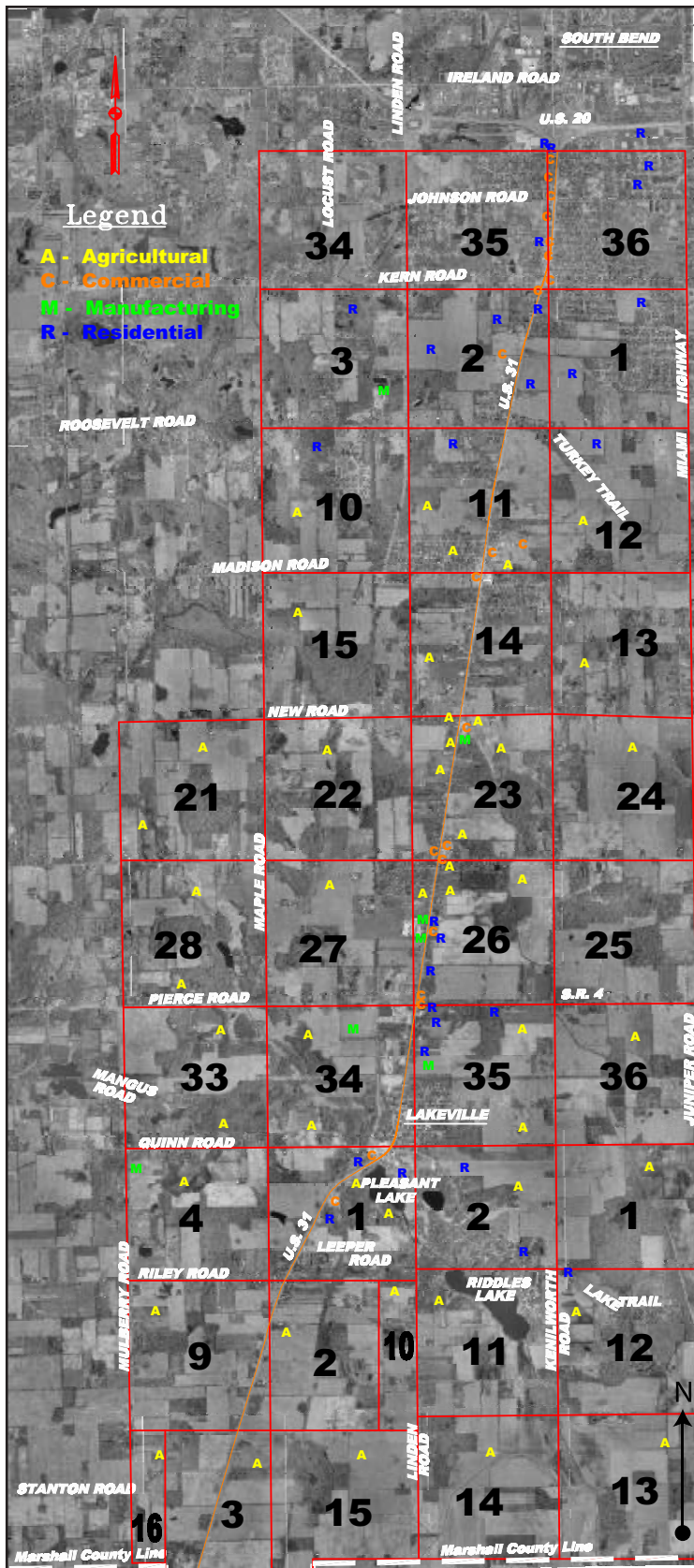


Figure 4.3.15: Marshall County Future Land Use Map



# US 31 Plymouth to South Bend

## Draft Environmental Impact Statement



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Figure 4.3.16: St. Joseph County Zoning Map

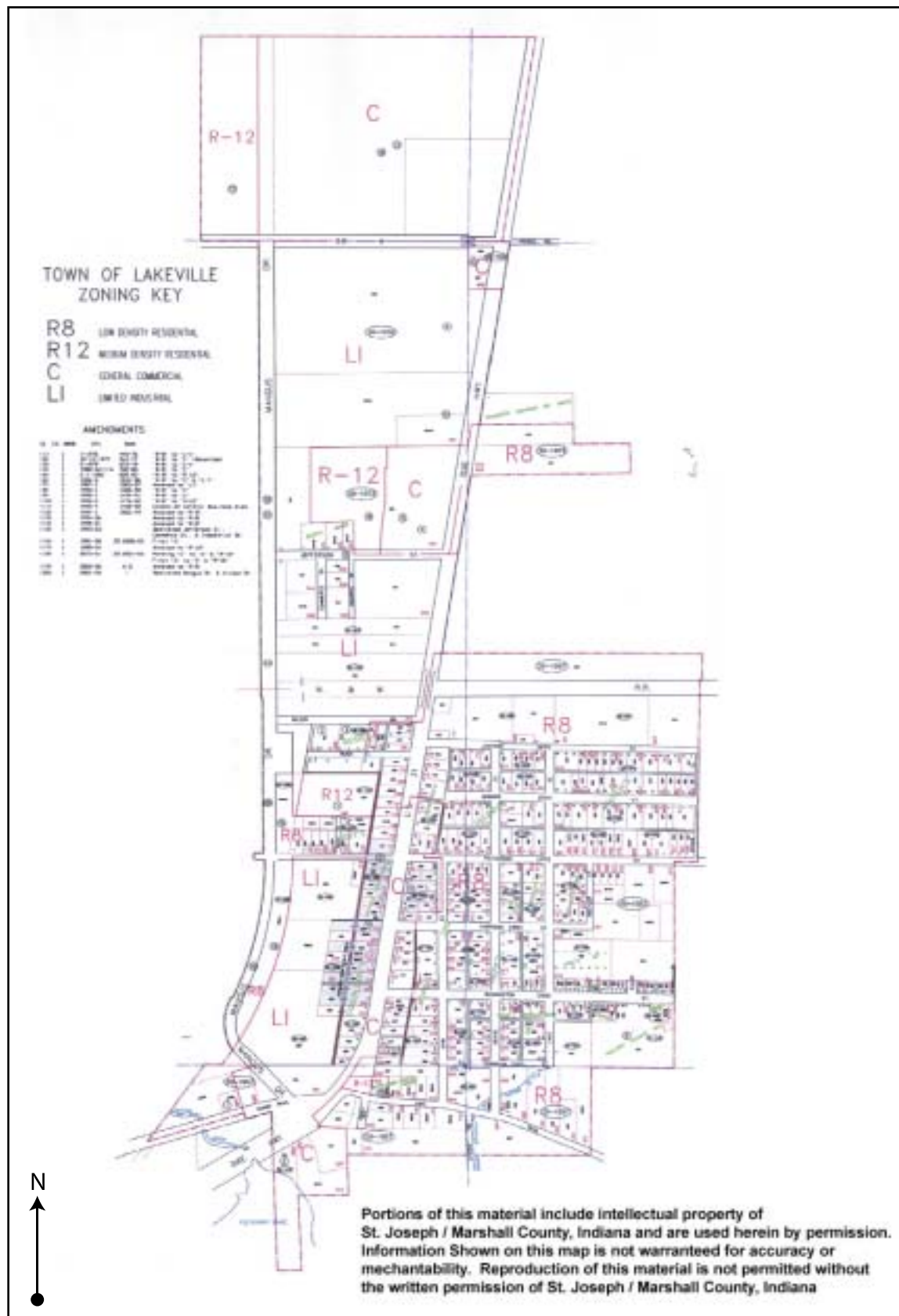


Figure 4.3.17: Lakeville Zoning Map

## **US 31 Plymouth to South Bend**

### **Draft Environmental Impact Statement**



- *Riddles Lake Subdivisions* – There are several subdivisions located south of Lake Trail and west of Kenilworth Road along the north side of Riddles Lake near the Town of Lakeville
- *Robin Hood Subdivision* – This small subdivision is located north of New Road less than one mile east of existing US 31. The subdivision has fewer than 10 homes and is located adjacent to Robin Hood Golf Course. These homes appear to be less than 10 years old
- *Colburn Subdivision* – This subdivision is located north of Lakeville and south of Osborne Road just west of US 31. There are approximately 50 to 60 single-family homes in this neighborhood. These homes appear to be 5 to 20 years old
- *Southern Acres Subdivision* – This subdivision is located north of Madison Road and just west of US 31 in St. Joseph County (Centre Township). There are approximately 100 single-family homes in this subdivision. The homes in this neighborhood appear to be 10 to 30 years old
- *Sun Communities Mobile Home Park* – This mobile home park is located along the east side of Locust Road between Madison and Roosevelt Road. There are approximately 200 mobile homes located in the park
- *Barber Mobile Home Park* – This small mobile home park is located on the west side of Locust Road between Roosevelt and Kern Road. There are less than 40 mobile homes located in this park
- *Kern Road Subdivision* – This subdivision is located on the south side of Kern Road between Locust Road and US 31 across from Whispering Hills Subdivision. There are approximately 30 homes in this neighborhood. The homes appear to be between 15 and 30 years old
- *Sycamore Hills Subdivision* – This subdivision is located along the east side of Lilac Road between Kern and Johnson Road. There are approximately 20 homes in this small subdivision and most of these appear to be less than 10 years old
- *Whispering Hills Subdivision* – This large subdivision is located between Johnson Road and Kern Road less than one mile west of existing US 31. There are over 120 large homes in this neighborhood. All appear to be less than 10 years old. There are still homes being constructed and some lots available throughout the subdivision
- *Baneberry Hills Subdivision* – This subdivision with approximately 80 homes is located adjacent and south of US 20 on the west side of Linden Road. The homes appear to be less than 10 years old
- *Weller's Heights Subdivision* – This is a small subdivision located adjacent and west of US 31 just north of Roosevelt Road. There are approximately 30 homes in this neighborhood
- *Gilmer South Michigan Subdivision* – This neighborhood is located just west of US 31 between Kern and Johnson Road. The subdivision has approximately 50 homes estimated to be between 30 and 50 years old
- *Gilmer Park Neighborhoods* – These subdivisions include Gilmer Park, Forest Park, and Hartman Terrace, all located east of US 31 and north of Kern Road. These are large older subdivisions (30 to 60 years old) with several hundred homes
- *Jewell's Dixie Gardens Subdivision* – This older neighborhood is located west of US 31 and north of Johnson Road and has approximately 120 homes. The homes appear to be between 40 and 70 years old



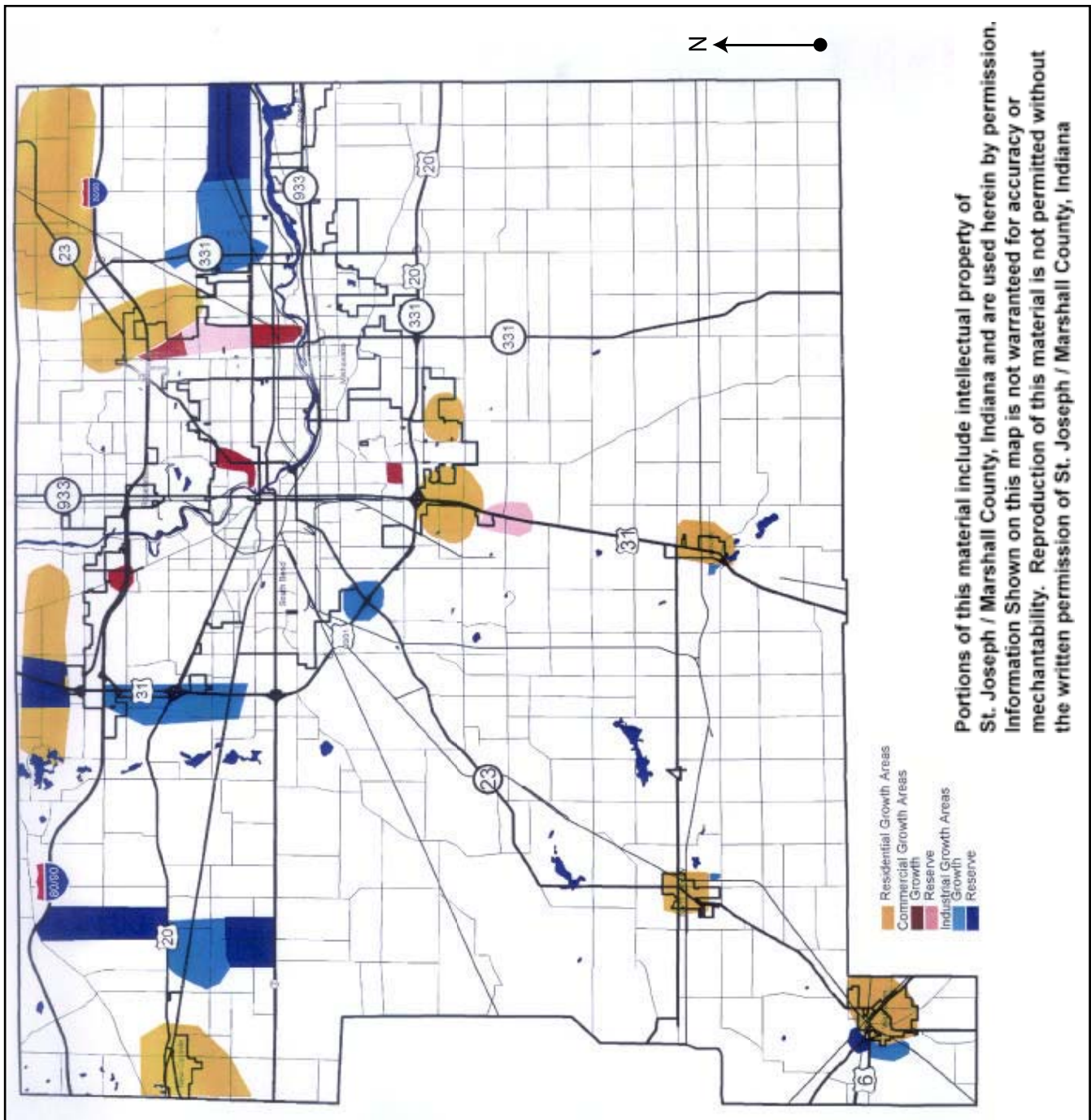


Figure 4.3.18: St. Joseph/South Bend Future Land Use Map



## US 31 Plymouth to South Bend

### Draft Environmental Impact Statement

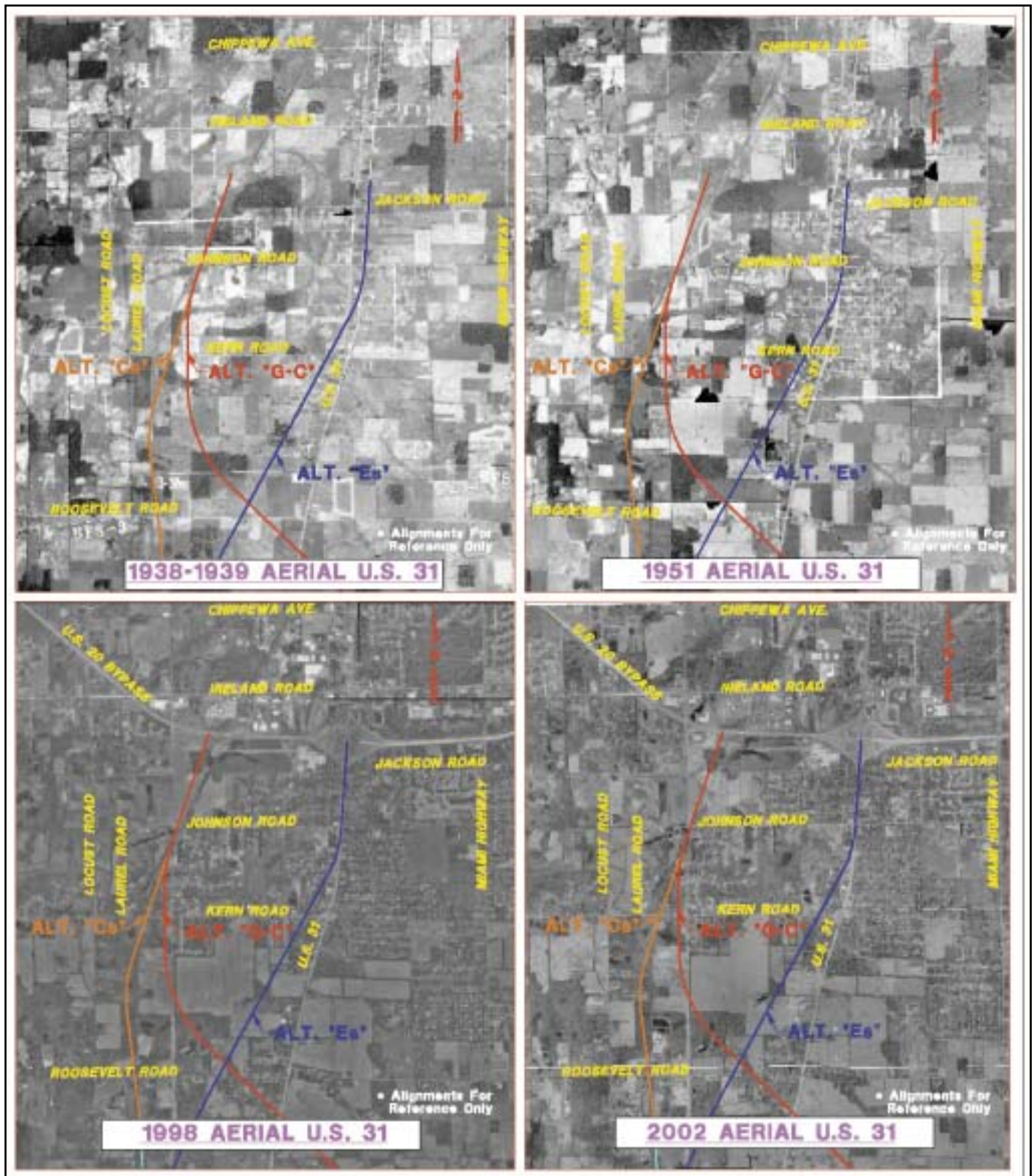


Figure 4.3.19: Historical Aerials US 31



#### 4.3.4.2 Community Cohesion

There are four incorporated areas within the project area. These include the Towns of Lakeville and LaPaz, and the Cities of Plymouth and South Bend. People in the southern half of the corridor (Marshall County) are likely more closely linked to the City of Plymouth for shopping, school and daily activities. The northern portion of the project area (St. Joseph County) is more closely linked to the City of South Bend for services, shopping, entertainment, and daily activities. Overall, however, the cities of South Bend, Mishawaka, and Elkhart at the north end of the corridor, drive the economy and character of the entire region.

Within the immediate project area, the neighborhoods are scattered and none of the subdivisions contain the necessary community services such as schools, groceries, medical services, and work places that make a community self-contained. The people living within this corridor travel up and down US 31 on a daily basis to shop and work.

There is some degree of community cohesion within these small subdivisions based on the relationships forged between neighbors. The local school districts also play a major role in the cohesiveness of the various communities within the project area.

A demographic profile of Marshall and St. Joseph Counties based upon 2000 census data is shown in Table 4.3.9.

Table 4.3.9: Demographic Profile of Marshall and St. Joseph Counties			
Characteristic	Indiana	Marshall County	St. Joseph County
Population	6,080,485	45,128	265,559
Persons 65 and older (percent)	12.4%	13.3%	13.6%
Black or African American (percent)	8.4%	0.3%	11.5%
White Persons non-Hispanic (percent)	87.8%	92.5%	80.5%
Hispanic or Latino (percent)	3.5%	5.9%	4.7%
Persons reporting 2 or more races (percent)	1.2%	1.0%	2.0%
Homeownership Rate	71.4%	76.8%	71.7%
Median value of owner-occupied housing units	\$94,300	\$88,100	\$85,700
Per capita income	\$20,397	\$19,756	\$18,427
Median household income	\$41,567	\$42,581	\$40,420
Persons below poverty (percent)	9.5%	6.8%	10.4%

### 4.4 Community Facilities and Services

#### 4.4.1 Schools

There are several school systems within the project area. The school systems and individual schools located within the project area are described below:



- *Plymouth Community School Corporation* – No Schools located near the project area
- *Union-North United School Corporation* – The Union-North School System includes Union Township in St. Joseph County and North Township in Marshall County. This includes much of the project area from just north of West 7B Road in Marshall County to New Road in St. Joseph County
- *Laville Elementary School* – located on Tyler Road just west of US 31. Includes approximately 710 students (kindergarten through 6<sup>th</sup> grade)
- *Laville Junior/Senior High School* – located on US 31 just north of Tyler Road. Includes approximately 600 students (7<sup>th</sup> through 12<sup>th</sup> grade)
- *South Bend Community School Corporation* – Includes the project area north of New Road
- *Forest G. Hay Elementary School* – located on Johnson Road just east of US 31. Includes approximately 438 students (kindergarten through 4<sup>th</sup> grade)
- *Andrew Jackson Middle School* – located on S. Miami Road east of US 31 and south of US 20. Includes approximately 811 students (7<sup>th</sup> and 8<sup>th</sup> grade)
- *St. Jude School* – Private catholic school located on Johnson Road just east of US 31. Includes approximately 223 students (kindergarten through 8<sup>th</sup> grade)

#### **4.4.2 Churches**

There are several churches located within the immediate project area. They include the following.

- *New Philadelphia Church* – US 6 east of US 31
- *Southside Church of God* – US 31 south of Kern Road
- *Southlawn United Methodist Church and Daycare* – US 31 north of Kern Road
- *St. Jude Parish* – Johnson Road east of US 31
- *Lakeside Baptist Church* – US 31 in Lakeville
- *Lakeville United Methodist Church* – US 31 in Lakeville
- *County Line Bretheren Church* – US 31 in Lakeville
- *Lakeville Christian Church* – Pierce Road in Lakeville

#### **4.4.3 Cemeteries**

There are several cemeteries located within the immediate project area. They include the following.

- *Mt. Calvary Cemetery* – located in St. Joseph County on the east side of US 31 just north of New Road
- *Van Buskirk Cemetery* – located in St. Joseph County at Roosevelt and Ironwood Road



- *Southlawn Cemetery* – located in St. Joseph County on the east side of US 31 just south of Kern Road
- *Mount Zion Cemetery* – located in Marshall County on the south side of Tyler Road just east of US 31
- *Lakeville Cemetery* – located in St. Joseph County on the east side of US 31 just north of Pierce Road
- *White Cemetery* – located in Marshall County on the north side of West 2C Road near Maple Road. This is a small family cemetery with approximately 15 gravesites.

#### 4.4.4 Libraries

The St. Joseph County Public Library has a Centre Township Branch located at Kern Road and Miami Street, and a Lakeville Branch located on US 31 in the Old Lakeville School Project just south of Pierce Road. The City of Plymouth has a public library within the city limits, but it is not near the project area.

#### 4.4.5 Fire Stations, Police Stations, and Emergency Medical Services (EMS)

North Township in Marshall County is served by the LaPaz North Township Volunteer Fire Department in LaPaz, Indiana. EMS services for Marshall County come from the City of Plymouth or from Union Township EMS in St. Joseph County. The Centre Township Volunteer Fire Department is located at 19971 East Kern Street in St. Joseph County. This fire station serves the unincorporated areas of Centre Township and the eastern portion of Greene Township. Emergency Medical Services for Centre Township respond from South Bend Fire Station #13 located on York Road.

The nearest Indiana State Police Post is located in Bremen just east of the project area. The Marshall County Sheriff's Office is located in the City of Plymouth. The St. Joseph County Police/Sheriff operates out of South Bend but serves the southern portion of St. Joseph County within the project area.

#### 4.4.6 Hospitals

There are three major hospitals in St. Joseph County. They include Memorial Hospital, St. Joseph Regional Medical Center, and St. Joseph Community Hospital. These facilities are all located north of the project limits in the greater South Bend area. South Bend Regional Medical Center also has a hospital located in Plymouth, Indiana.

#### 4.4.7 Public Parks and Recreation Areas

The following public parks and recreation areas are located in the project area.

- *Potato Creek State Park* – Located on SR 4 (Pierce Road) approximately three miles west of US 31
- *Newton Park* – A local park located on the north side of Lakeville, south of Pierce Road and west of US 31
- *Jackson Road County Park* – Under development at Jackson Road and Locust Road in St. Joseph County, just south of US 20.
- *Obrien Park* – A South Bend Park located on the east side of US 31 north of Ireland Road
- *Pleasant Lake Public Access Ramp* – Located south of Lakeville and east of US 31





## 4.4.8 Utilities

NIPSCO supplies the project area with natural gas and electrical service. NIPSCO has approximately 700,000 natural gas customers and 430,000 electric customers in northern Indiana. There are several natural gas pipelines and large electrical transmission lines crossing through the project area. Most of the project area is not serviced by sanitary sewer systems or public water supplies, however there are sewer and water mains located near the north terminus and within the incorporated areas of Lakeville and LaPaz.

## 4.5 Farmland

Since early settlement, agricultural land in Indiana has been, and continues to be, one of the most valuable natural resources within the state. However, there is a continued loss of farmland, specifically prime farmland, as cities expand and rural development for industry and housing becomes more attractive. This trend holds true for Marshall and St. Joseph counties as well. Figures 4.5.20 and 4.5.21 illustrate the historic decline of farmland use in Marshall and St. Joseph counties respectively from 1900 to 1997.

Marshall and St. Joseph counties are two of the nine counties that comprise the North Central Agricultural Statistics District in Indiana. Data from the 1997 census of agriculture indicated farmland in Marshall County encompassed 201,637 acres on 865 farms. St. Joseph County farmland included 154,142 acres on 666 farms. The average value per acre for land and buildings in 1997 was \$1,992 for Marshall County (46th in Indiana) and \$2,258 for St. Joseph County (31st in Indiana). Figure 4.5.22 illustrates the average value per acre for Marshall and St. Joseph counties relative to other counties in the agricultural statistics district as well as the state averages.

Typical agricultural commodities produced in Marshall and St. Joseph counties include corn, soybeans, winter wheat, and hay. Figure 4.5.23 illustrates corn, soybean and wheat production in 2002 for Marshall and St. Joseph counties as well as the other counties of the North Central Agricultural Statistics District. Marshall and St. Joseph are also two of 40 counties in Indiana where popcorn is produced. Livestock production in Marshall and St. Joseph counties includes cattle (milk and beef), hogs, and sheep. Marshall County ranked 10th in hay production compared to other Indiana counties in 2002, but no higher than 19th for corn, soybeans, or wheat. 1997 agricultural census data also indicate that Marshall County ranked 10th in popcorn production for the state. Additionally, Marshall County ranked 5th in the state for milk cows in 2003 and 4th in the state for sheep in the 1997 census. St. Joseph County has not ranked in the top ten for any crop commodity or livestock for the past seven or more years of data.

Total cash receipts (crops and livestock) for Marshall and St. Joseph counties in 2001 were \$62,631,000 and \$61,102,000 respectively, ranking them 34th and 36th in the state. The collective \$123.7 million total cash receipts for Marshall and St. Joseph county crops in 2001 represent 3.8% of the total crop cash receipts (\$3.21 billion) reported for the state in that year. Other income in the form of government payments and imputed income totaled \$18,458,000 for Marshall (37th) and \$17,854,000 for St. Joseph (42nd). An even better indicator of the return on farmland within each county is the crop cash receipts per harvested acre. Based on 1997 Agricultural Census data for crop cash receipts and harvested cropland, Marshall and St. Joseph counties generated an estimated \$356.73/acre and \$407.30/acre respectively (Figure 4.5.24). Both are slightly above the \$332.41/acre estimate for the counties comprising the North Central Agricultural Statistics District and even higher still than the state average of \$291.41.

Farmland preservation and the conversion of prime and unique farmland to urban development are serious issues in Indiana. Continued population growth, increases in transportation systems and efficiency, and communication flexibility are some of the factors which make it increasingly easier to live and work in widely-dispersed communities today. The Hoosier Farmland Preservation Task Force indicates that from 1978 to 1992 an average of 88,714 acres of farmland per year have been lost to other uses (Indiana Land Resources Council, 1999). The Natural Resource Conservation Service (NRCS) estimates that prime and important agricultural soils are being converted at a rate three



to four times that of less productive non-prime farmland (United States Department of Agriculture, 2002). In light of this trend, one of the goals of the Farmland Protection Program is to protect and slow the loss of farmland. The concern is not so much the overall acreage of cropland converted to urban development, but the quality and pattern of cropland conversion. Preservation strategies are not intended to be anti-development or anti-growth, but instead to concentrate efforts that will direct industrial, residential, and commercial growth to areas less suitable for farming, thus preserving more valuable prime farmland, and ultimately achieve a balanced utilization of rural, suburban, and urban land resources (Indiana Land Resources Council, 1999).

As defined by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), prime farmland is “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and that is available for these uses (i.e., land that could be cropland, pastureland, rangeland, forest land or other land, but not urban built-up land or water).” It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or it is protected from flooding (SSM, USDA Handbook No. 18, October 1993).

In 1997, 12.9 million acres of Indiana was considered rural prime farmland, placing it eighth in the country in total acreage of this resource. Only three states have more than 50% of their land area classified as prime farmland: Indiana, Illinois, and Iowa (Indiana Land Resources Council, 1999). In fact, at 58%, Indiana ranks second only to Illinois in the percent of its land that is considered prime farmland. However, with 124,200 acres of prime farmland converted to developed land from 1992 to 1997, Indiana ranks second in the highest percent of prime farmland conversion in the nation and seventh in the average annual rate (24,800 acres/year) of prime farmland converted to developed land (United States Department of Agriculture, 1997). Eighty-four percent of Indiana’s prime farmland in 1997 was utilized for cropland, 6% was devoted to pastureland, and the remaining 10% was in the form of forestland, Conservation Reserve Program (CRP) land or miscellaneous rural land.

Twenty-nine of the 56 mapped soil series for Marshall County are prime farmland soils with an additional six soil series considered state important. Collectively, these soils comprise 80% of the county. The predominant prime farmland soils for Marshall County in descending order include: Rensselaer, Crosier, Riddles, Brookston, Gilford, Metea, and Oshtemo. All other prime farmland soil series individually comprise less than 3% of the county. Houghton and Adrian muck soils are the principal state important soils of the county.

In St. Joseph County, 45 of the 167 mapped soil series are prime farmland soils with an additional fourteen considered state important. Collectively these soils comprise 64% of the county. For St. Joseph County the predominant prime farmland soils include: Crosier, Brookston, Rensselaer, Coupee, Oshtemo, and Riddles-Oshtemo. Houghton, Adrian, Maumee, and Antung are the principal state important muck soils for the county.

Today, the US 31 study area remains largely agricultural or wooded with the exception of the south side of South Bend and other localized development. The majority of the farmland conversion that has taken place in the study area over the past several decades occurs along, or in close proximity to US 31 or major intersecting roads. The towns of Lakeville and LaPaz represent the greatest concentration of development between Plymouth and South Bend. A review of the study area suggests that there is no one location that is currently experiencing large scale development resulting in farmland loss. However, continued growth south of South Bend and US 20 will ultimately cause additional farmland loss in the future.

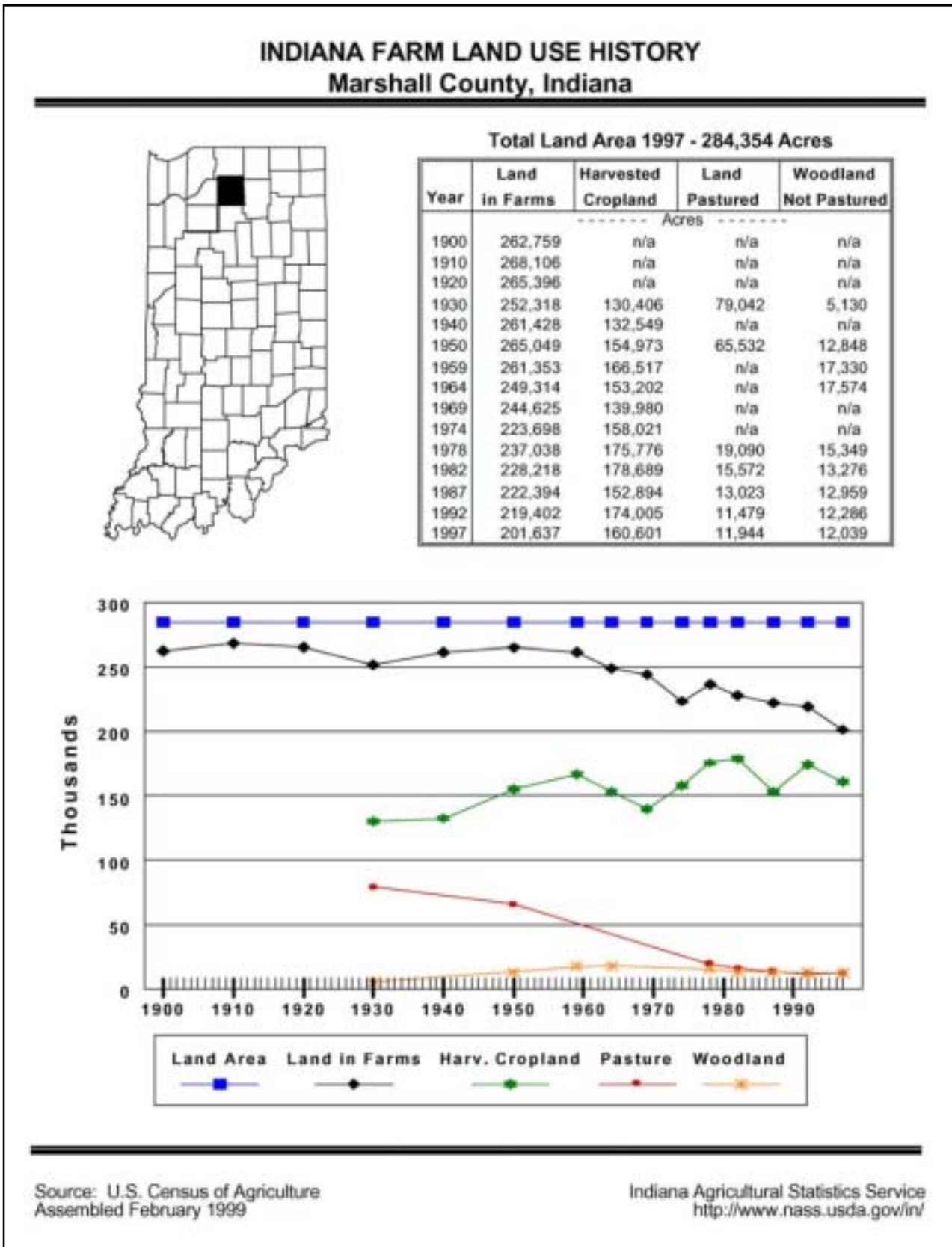


Figure 4.5.20: Farm Land Use History for Marshall County, Indiana



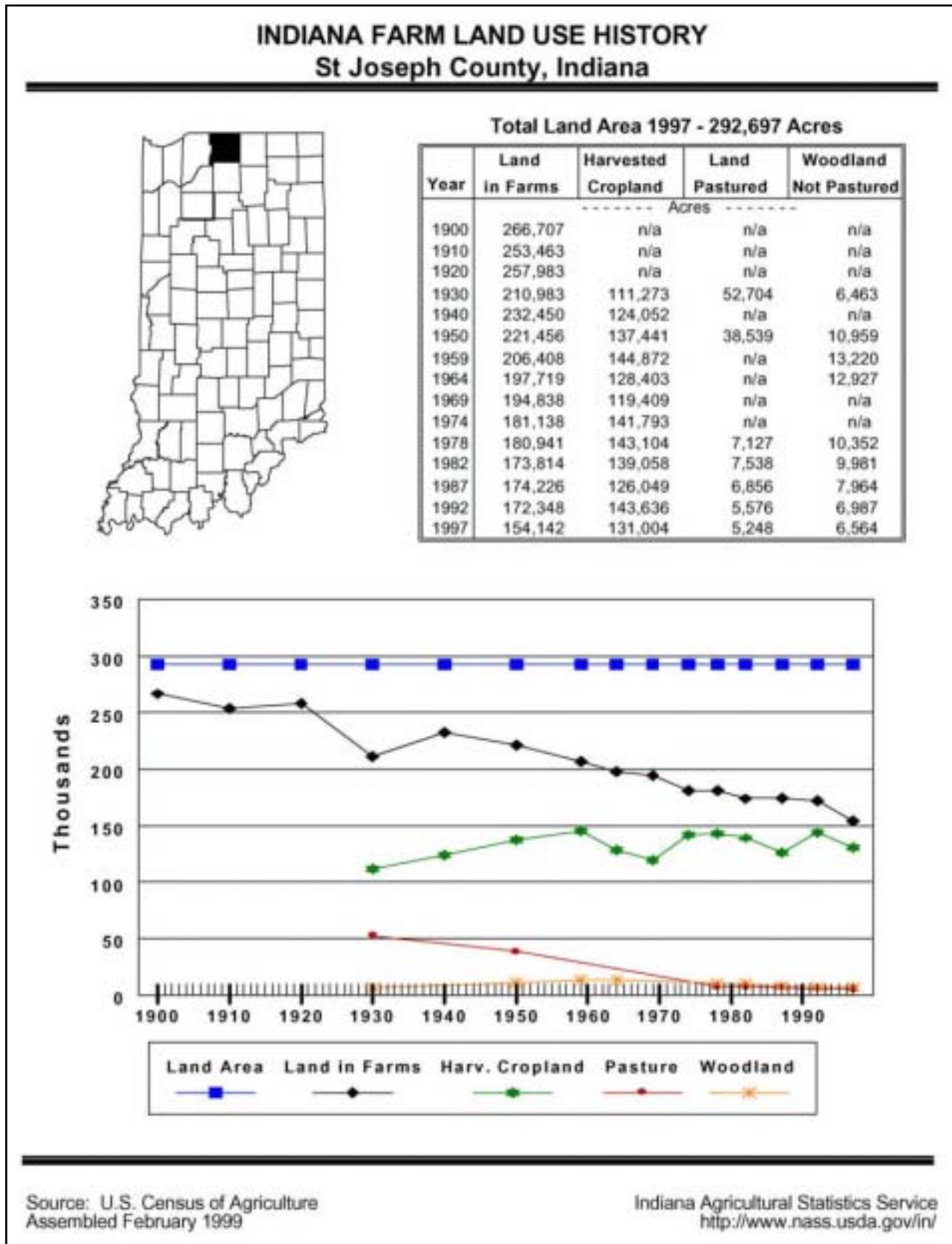


Figure 4.5.21: Farm Land Use History for St. Joseph County, Indiana

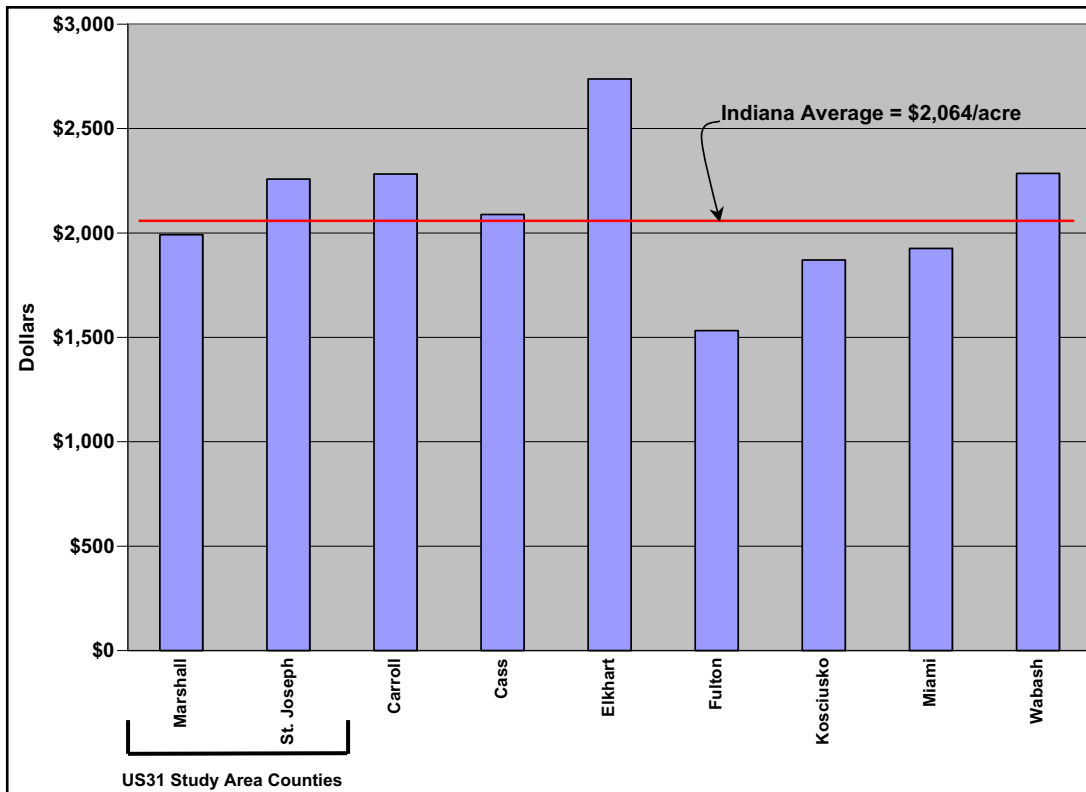


Figure 4.5.22: 1997 Average Value of Farmland Per Acre for Marshall and St. Joseph Counties and North Central Agricultural District

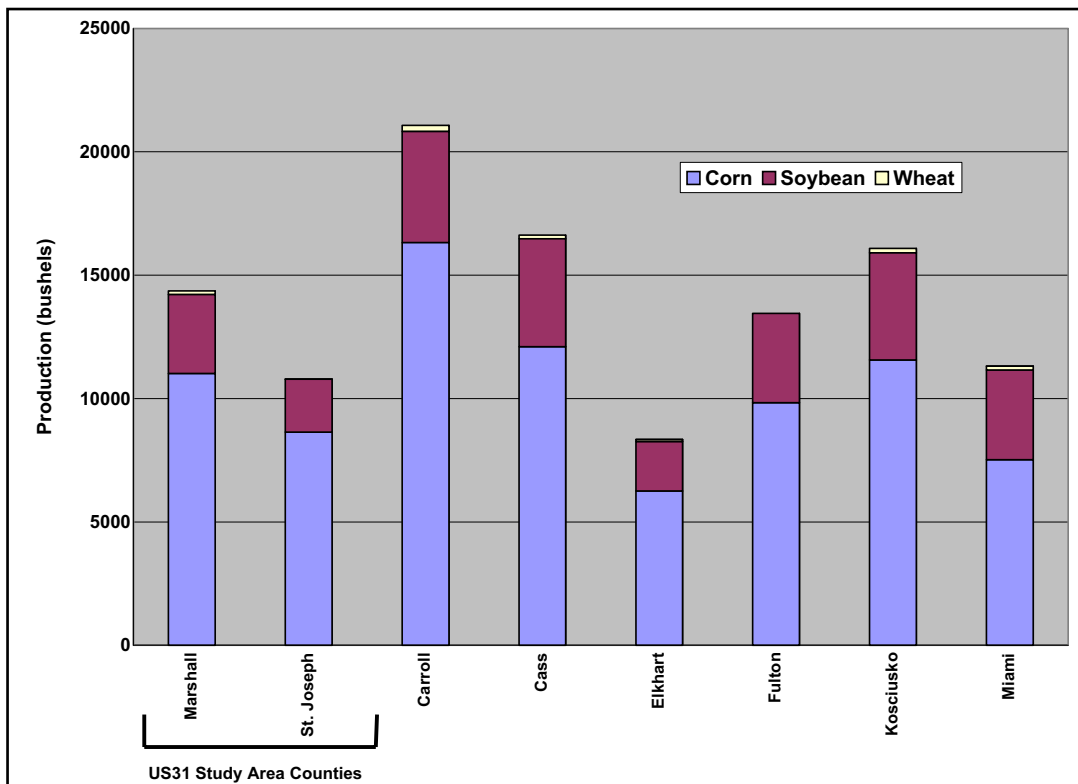


Figure 4.5.23: 2002 Crop Production for Marshall and St. Joseph Counties and North Central Agricultural District

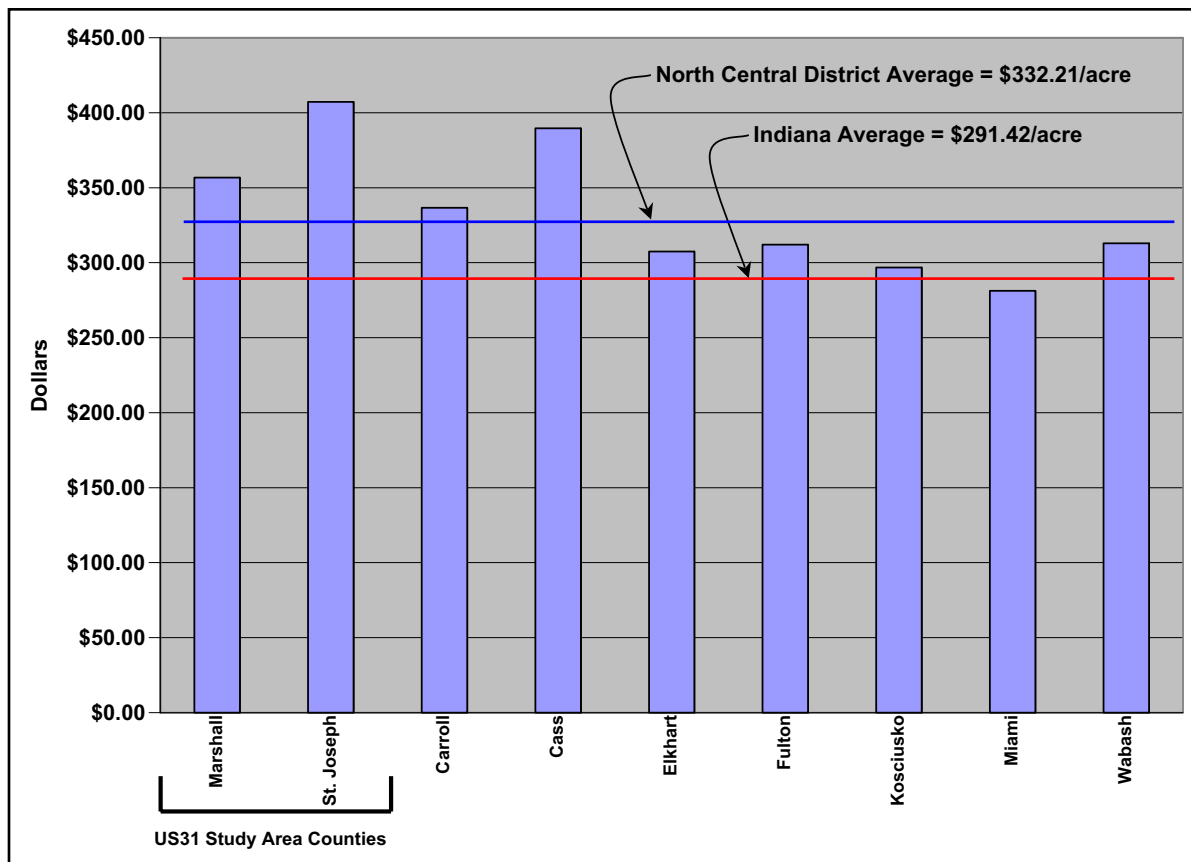


Figure 4.5.24: 1997 Crop cash Receipts Per Acre Harvested for Marshall and St. Joseph counties and North Central Agricultural Statistics District Counties

## 4.6 Historic and Archeological Resources

Congress set forth the importance of historic and archaeological resources upon the fabric of American life as part of the National Historic Preservation Act (1966) (NHPA), which states that “the historical and cultural foundations of the Nation should be preserved as part of our community life and development in order to give a sense of orientation to the American people.” [16 U.S.C. 470b (2)]

### 4.6.1 Historic Resources

As a result of the NHPA, as amended, and CFR Part 800 (Revised January 2001), federal agencies are required to take into account the impact of federal undertakings upon historic properties in the area of the undertaking. Historic properties include buildings, structures, sites, objects, and/or districts within the Area of Potential Effects. The Area of Potential Effects (APE) is defined as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. [36 CFR 800.9(a)]. In accordance with Section 106, NHPA of 1966, as amended, and CFR Part 800 (Revised January 2001) and Final Rule on Revision of Current Regulations dated 12 December 2000, historic properties were identified and evaluated, eligibility determinations were made, and then preliminary findings of the effects of the undertaking upon eligible properties were assessed. The Section 106 Report in the Appendix describes these steps in detail.

Historic properties within the APE were evaluated to determine their eligibility for listing in the National Register of Historic Places (NR) based on integrity and historical significance. These properties must meet one or more NR criteria for evaluation. These criteria are:



- associated with events that have made a contribution to the broad patterns of history
- associated with the lives of persons significant in our past
- embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant or distinguishable entity whose components may lack individual distinction
- have yielded, or may be likely to yield, information important in prehistory or history

According to the NR, “integrity is the ability of a property to convey its significance.” Integrity has seven aspects: location, design, setting, materials, workmanship, feeling, and association. As part of the evaluation process, seven exemptions were taken into account, as specified in 36 CFR 60.4. “Ordinarily cemeteries, birthplaces or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years...” are not eligible for listing in the National Register. Although the exemptions are applicable, the presence of documented cemeteries was verified whenever practical, and churches were included whenever they illustrated an architectural or historical theme.

## **Identification and Evaluation of Historic Resources**

The Area of Potential Effects for this project was defined as one mile from the centerline of the undertaking, except in urban areas where the APE was reduced to 1000 feet on either side of the centerline. A historic context statement in the Section 106 Report discusses the historical context of the affected environment of the Study Area.

Most properties within the APE are agricultural or suburban development. However, the small towns of LaPaz and Lakeville are also located within the APE for the alternatives brought forward for this study. Neither possesses any buildings eligible for listing in the NR and most suburban development has occurred in the modern era (less than fifty years old); however, the Lakeville High School is listed on the National Register and is located north of downtown Lakeville. Therefore, the largest inventory of historic properties bears a historic association to farming.

There is a large inventory of bank barns, many with a high degree of integrity. Some of these bank barns are considered “high style” with shutters and ornate painting. Although the interim report for St. Joseph County identified a large number of Sweitzer barns, in fact most of those barns were simply bank barns with a forebay overhang. Sweitzer barns are rare in this study area; one was identified at the Conrad Schafer Farmstead, but others may exist outside the APE. In addition to the large inventory of barns, there were also concentrations of Italianate or Italian Villas in the study area. These properties were associated with the Country Home Movement and were probably influenced by the pattern books of Andrew Jackson Downing.

Potential historic districts along Miami Trail, Palmer Prairie, and Sumption Trail were studied carefully and consulting parties were consulted frequently during the process. In the case of the potential historic district considered along Miami Trail, the presence of modern homes and the extreme distances between historic properties created an unfavorable balance of historic and modern properties that argued against a viable large rural district. Also, the distance between the individual properties resulted in an area lacking the contiguity required for establishing a district. In the instance of Palmer Prairie, a small rural community with a church, residences, and possibly some businesses, most of the buildings are now gone or severely altered. The Ullery/ Farneman House alone possesses integrity for listing in the National Register. The homes along Sumption Trail in the northwest corner of the study area qualified as a potential historic district, but fell out of the APE after the first screening of alternatives.



The study team consulted frequently with State Historic Preservation Office (SHPO), consulting parties, and other knowledgeable persons. They discussed districts, especially those proposed by consulting parties. They also talked with the SHPO staff about integrity issues with single properties, especially those with higher levels of integrity.

The following is a timeline of consultation for this project:

June 6, 2003 – Consulting party meeting regarding APE

June 15-16, 2003 – Coordination and research visits with Historic Landmarks Foundation of Indiana (HLFI) and South Bend and St. Joseph County Historic Preservation Commission (HPC)

July 14-15, 2003 – Coordination and research at the HPC and research at the Northern Indiana History Center

July 15, 2003 – Meeting with Todd Zeiger, HLFH regarding group's concerns

July 25, 2003 – SHPO letter concurring with APE submitted May 15, 2003

August 13, 2003 – Meeting with SHPO regarding eligibility

September 2, 2003 – SHPO letter concurring with revised APE and with eligibility determinations

September 4, 2003 – Consulting party meeting regarding eligibility

October 22, 2003 – Conducted fieldwork with HPC representative to resolve questions about properties of local concern

January 23, 2004 – Conducted fieldwork on properties of local concern submitted by Wythougan Valley Preservation Council, Inc. (Added Wythougan Valley Preservation Council, Inc. as a consulting party)

## Eligibility Findings

There are two properties within the APE already listed in the National Register:

- Lakeville High School
- Evergreen Hill

The investigation revealed eight other properties eligible for the National Register. (See Appendix for SHPO letters of concurrence.) However, as alignments were shifted the Peter Schafer Farmstead, the Conrad Schafer Farmstead, and the Court Farm were no longer within the APE. Those eligible within the APE are:

- Cover House
- Emil Johnson House
- Ullery/Farneman House
- Francis Donaghue Farmstead
- W.O. Bunch Farm



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**Lakeville High School**, built in 1931, is located at 601 North Michigan Street in Lakeville. The two-story brick building has limestone detailing along the lintels of the second story window openings, as the cap on the cornice, and the Gothic arch entryways. Lakeville High School, presently a community center known as the Old Lakeville School Project, was listed in the NR in 1991.

**Evergreen Hill**, also known as the Franklin Rupel Farm, encompasses a tract of approximately 38 acres in Section 26, Township 37N, Range 2 East. The property at 59449 Keria Trail includes an Italianate house built in 1873, a period barn, other outbuildings, and a family cemetery. Evergreen Hill was listed in the NR in 2001.

The **Cover House** at 20909 Ireland Road in Centre Township, St. Joseph County is an excellent example of a Prairie-style residence. Built in 1920 on a lot near the intersection of Chippewa Avenue and US Highway 31, the house was moved to its present location circa 1975 to rescue it from demolition. Elevated above Ireland Road and surrounded by gardens and manicured lawns, the two-and-one-half-story dwelling has brick exterior walls, an enclosed porch, tile roof, and porte-cochere.

The **Emil Johnson House**, located at 60717 Locust Road in Centre Township, St. Joseph County, is a two-and-one-half-story Tudor Revival residence (circa 1914) with outstanding integrity. Enclosed on the east side of the property with a brick wall and wrought iron gate, the property contains the house and a one-story garage. The exterior walls of the house are brick with half-timbering in the gable ends.

The **Ullery/Farneman House**, built circa 1855, is located at 61191 US Highway 31, in Centre Township, St. Joseph County. Built by one of the pioneer families in the county, the two-story brick house demonstrates early Italianate architectural details. Although marginally altered with updated mechanical improvements, the scale and interior spatial organization remains relatively unchanged and upon entry into the interior, one returns to an earlier time.

The **Francis Donaghue Farmstead** consists of a residence, a Pennsylvania German bank barn, a poultry house, a non-period garage, a well house, and a privy. Located at 63049 Turkey Trail in Centre Township, St. Joseph County, the Italianate dwelling retains a high degree of integrity irrespective of the modern garage wing extending from the north elevation. Built in 1861, the two-story brick house demonstrates classic Italianate details including ornate window hoods, prominent eaves brackets, and a lavish use of the arch as architectural elements. The other buildings on the property, examples of which appear in many locales, retain high degrees of integrity.

**The W.O. Bunch Farm** is located at 20538 Pierce Road in Union Township, St. Joseph County. The farm consists of a residence, a barn, and a collection of nine outbuildings dedicated to different farm functions. It



Figure 4.6.25: Lakeville School



Figure 4.6.26: Evergreen Hill



Figure 4.6.27: Cover House



Figure 4.6.28: Johnson House



also demonstrates historic field patterns to the rear and east of the complex of buildings. The residence is a two-story, gabled ell (with Greek Revival detail) built circa 1890. It has alterations but retains sufficient architectural integrity. The Pennsylvania German barn is the centerpiece of the working elements of the farm. Between two doors in the north elevation is a sign with the inscription, “W.O. Bunch Family Farm.”

As noted above, the Peter Schafer Farmstead, the Conrad Shafer Farmstead, and the Court Farm were located in the APE prior to alternatives being shifted. **Peter Schafer’s Farmstead**, located at 18799 Roosevelt Road in Centre Township, St. Joseph County, consists of a collection of agricultural buildings and a Queen Anne residence. **The Conrad Schafer Farmstead** contains one of only two Sweitzer barns found in the study area. Located at 65154 Miami Highway in Union Township, St. Joseph County, the farmstead contains a Greek Revival residence, three barns, silos, and a milk house. Austere in appearance, the residence and the collection of agricultural buildings retain a high degree of integrity. **The Court Farm**, an example of an early-twentieth-century dairy farm, is located at 18681 Osborne Road in Union Township, St. Joseph County. The farm consists of a residence, a small well house, a granary, livestock holding facility, a garage, a drive-through corncrib, silos, a poultry house, a large gambrel-roof barn, and some surrounding pastures.

## 4.6.2 Archaeological Resources

The archaeological records check and literature search for this project utilized the resources of several organizations and facilities in order to provide a complete and comprehensive listing of the previously documented archaeological sites present within the US 31 study area. In addition, previous archaeological research and compliance projects within and around the proposed alternatives were examined in order to determine the potential for the study area to contain archaeological resources.

The primary data for this project came from archaeological site forms, a computer database, topographic maps, and archaeological reports on file at the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology (IDNR, DHPA). In addition, reports on file at Landmark Archaeological and Environmental Services, Inc., that contained information regarding previous archaeological investigations in the study area were also examined. Additional information about the study area was collected from various historic maps and documents on file at the Indiana State Library, the Marshall County Historical Museum, and the St. Joseph County Library. County and state maps, road maps, and plat maps from the late nineteenth and early twentieth centuries were also studied in order to assess the potential for historic archaeological sites within the study area.

Finally, cemetery data for the study area was obtained from cemetery database records at IDNR, DHPA, USGS 7.5 minute topographic maps, county interim reports, and records at the Indiana State Library. This was done in order to assist in the avoidance of known historic cemeteries that might be affected by the alternatives in this study.



Figure 4.6.29: Ullery/Farneman House



Figure 4.6.30: Francis Donaghue Farmstead



Figure 4.6.31: W.O. Bunch Farm



The archaeological records check and literature search revealed that there has been very little archaeological research done in north-central Indiana as compared to the remainder of the state. The result of this lack of archaeological research is a limited understanding of the prehistory of the area and the tendency of archaeological professionals to refer to the region as an “archaeological void.” That is not to say that archaeological sites do not exist, only that very little work has been done in the way of recording them.

During the archaeological records review of the study area thirty-one previously recorded archaeological sites were identified within the study bands (an area one mile on either side of the working alignment). These sites include twelve prehistoric isolates, fifteen prehistoric camp/habitations, one artifact scatter, one farmstead, one trading post and prehistoric camp of unidentified cultural affiliation, and one Native American burial area. Although none of these sites has been recommended as eligible or potentially eligible for inclusion on the National Register of Historic Places, twelve have had additional archaeological work recommended to help determine their eligibility status.

In addition to the previously recorded archaeological sites identified during the archaeological records check and literature search, ten known cemeteries were also found to be located within the study bands for this project.

## 4.7 Air Quality

There are two objectives to the air quality analysis. First, in accordance with NEPA, the air quality analysis provides information on the mobile source emissions associated with each alternative. Second, in accordance with Section 176(c) of the Clean Air Act, the air quality analysis will be used to demonstrate that the selected alternative is in conformity with applicable air quality plans. Air quality impacts are both regional (i.e., meso-scale concerns) and local (i.e., micro-scale concerns) in scope.

### 4.7.1 Regulatory Setting

#### 4.7.1.1 Overview

The Clean Air Act and the 1990 Clean Air Act Amendments (CAA) required the United States Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants that are considered to be harmful to the public health and environment. The USEPA set forth standards for six principal pollutants – particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), ozone, oxides of nitrogen (NO<sub>x</sub>), and lead. Generally, when levels of pollutants do not exceed the annual average standards and do not exceed the short-term standards more than once per year, an area is considered in attainment of the NAAQS. An area that does not meet the NAAQS for one or more pollutants is known as a “nonattainment area.” An area that was formerly in nonattainment and now meets the NAAQS is known as a “maintenance area” for a period of 20 years. Under the CAA, each state is required to establish a plan for achieving and/or maintaining the NAAQS in nonattainment and maintenance areas. This plan is known as the State Implementation Plan (SIP). In nonattainment or maintenance areas, the Metropolitan Planning Organization (MPO), as the designated agency for transportation planning in the metropolitan area, is required to demonstrate continuing conformity of their Long Range Plan (LRP) and short-range Transportation Improvement Program (TIP) with the mobile emission budgets established in the SIP for air quality. Further, in accordance with the federal transportation metropolitan planning requirements (23 USC 135 and 23 CFR 450), “regionally significant” transportation projects must be included in a LRP and a TIP that have undergone an emissions analysis to demonstrate conformity with the SIP.

#### 4.7.1.2 Applicability

Within the US 31 Improvement Project study area, all counties are currently in attainment of the NAAQS. However, St. Joseph and Elkhart counties were at one time designated marginal nonattainment areas for ozone (specifically





including volatile organic compounds and nitrous oxides, and excluding carbon monoxide) under the Clean Air Act Amendments of 1977, but have carried an air quality “maintenance area” designation since November 30, 1994. Therefore, the air quality conformity requirements are applicable to these counties for volatile organic compounds (VOC) and nitrous oxide (NOX).

For all US 31 Build Alternatives, regional air quality analyses were conducted for St. Joseph and Elkhart counties to identify air quality impacts and to evaluate conformity with the SIP using MOBILE 5 emission factors with Tier 2 Motor Vehicle Emissions Standards.<sup>3</sup> Because maintenance of the NAAQS for mobile sources (cars and trucks) in these two counties for ozone is the issue, the regional air quality analyses focus on the three major precursors to ozone – hydrocarbons (also known as volatile organic compounds or VOCs), CO, and NOX. However, CO is not considered a major contributor to ozone in St. Joseph and Elkhart counties, and the counties have always been considered attainment areas for NAAQS CO standards.

The US 31 Improvement Project appears in the MACOG 2025 Transportation Plan Update (March 18, 2002) for which MACOG conducted transportation air quality conformity analyses. FHWA and FTA jointly determined that the LRP Update met transportation conformity requirements on April 22, 2003. The US 31 Improvement Project has also been included in the MACOG TIP for 2004-2006, and the associated transportation conformity analysis has also been approved by FHWA and FTA (November 23, 2003).

#### 4.7.1.3 Air Quality Modeling

**MOBILE 5 versus MOBILE 6.** The MOBILE model for estimating pollution from highway vehicles was first developed by USEPA in 1978. MOBILE 5 was released in 1993, and was used by the MACOG in 2002 and 2003, for the air quality conformity determinations that included the US 31 Improvement Project in their LRP and TIP. The USEPA released MOBILE 6 on January 29, 2002, as the first major revision to MOBILE since MOBILE 5. MOBILE 6 is based on new emissions data and reflects regulations that have been issued since MOBILE 5.

There are a number of reasons why emissions estimates are different in MOBILE 5 and MOBILE 6. These reasons include new knowledge (such as pollution control technologies in the late 1980s proving to be more durable than had been expected when MOBILE 5 was developed<sup>4</sup>) or new rules (such as the final rule on Tier 2 Motor Vehicle Emissions Standards of February 10, 2000, resulting in more stringent emission requirements for SUVs and pickup trucks).

When the USEPA released MOBILE 6, a two-year grace period ending January 29, 2004, was established to permit the transition from MOBILE 5 to MOBILE 6 for transportation conformity analyses. While the USEPA rule encourages the use of MOBILE 6 or MOBILE 5 with Tier 2 estimates for conformity analyses during the two-year grace period, MOBILE 5 can continue to be used for conformity analyses through January 29, 2004. Only if a state updated the emissions budgets in the SIP to MOBILE 6 would transportation conformity analyses using MOBILE 6 be compelled prior to January 29, 2004. For Indiana, the MOBILE 5 emission budgets established in the SIP by IDEM are expected to continue until the SIP is updated for the 8-hour ozone standard area designations. Accordingly, MACOG may continue to use MOBILE 5 for transportation conformity evaluations through January 29, 2004. After that date, MACOG must use MOBILE 6 for any amendments to the TIP or LRP.

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<sup>3</sup> MOBILE 5 Information sheet #8: Tier 2 Benefits Using MOBILE 5; U.S. Environmental Protection Agency; April 2000. “Tier 2” in this context, refers to “Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements” that have been enacted subsequent to the release of the MOBILE 5 emissions factors.

<sup>4</sup> Frequently Asked Questions on MOBILE 6; USEPA; January 16, 2002.



**8-Hour Ozone Standard.** After the deadline for use of MOBILE 5 for emission estimates on January 29, 2004, the next critical date for transportation conformity analyses is April 15, 2004, when USEPA is expected to designate areas as non-attainment for the 8-hour ozone standard. On July 15, 2003, then-Indiana Governor O'Bannon recommended to the USEPA the designation of St. Joseph and Elkhart counties as non-attainment for the 8-hour ozone standard. On December 3, 2003, USEPA accepted the Governor's recommendation, and anticipates making the official designation on April 14, 2004. When USEPA designates non-attainment counties for the 8-hour ozone standard, there will be a one-year grace period to demonstrate TIP/LRP conformity. USEPA is currently developing procedures for agencies to follow to demonstrate conformity.

## **4.7.2 Existing Ambient Air Quality**

As previously noted, St. Joseph and Elkhart counties are presently "maintenance areas" for ozone. The SIP has established emission budgets of 20.68 tons per day for VOC and 27.24 tons per day of NOX that are not to be exceeded by mobile emissions. (For informational purposes only, the SIP includes an emission budget of 142.24 tons per day for CO.) Accordingly, any major roadway capacity expansion (such as the US 31 Improvement Project) must be in the MPO's LRP and conform to the SIP emission budgets. MACOG's current LRP and TIP include the US 31 Improvement Project, and FHWA and FTA have jointly made a determination that these documents conform to the SIP on April 22, 2003, and November 14, 2003, respectively.

The US 31 Improvement Project must also conform to NAAQS for CO involving 35 ppm for one-hour and 9.0 ppm for eight hours. CO is a site-specific pollutant, and major concentrations are generally found adjacent to roadways at high-volume intersections where human activities may be affected.

## **4.8 Highway Noise**

As Indiana's transportation system expands with new roadways and the traffic capacity of existing roadways increase, the communities through which these facilities run continue to be subjected to higher levels of highway related noise. Such intrusions have become a growing environmental concern, especially in high density urban settings and outlying urban/suburban areas where large numbers of residential properties along high volume Interstates and highways are routinely affected.

The FHWA requires that all states have an approved policy to identify and address highway traffic noise impacts. INDOT's noise policy (INDOT, 1997) was developed to implement the requirements of 23 CFR 772 and the noise-related requirements of the National Environmental Policy Act of 1969 and received FHWA approval on October 15, 1997. The structure of the policy is based on FHWA's "Highway Traffic Noise Analysis and Abatement: Policy and Guidance" (USDOT, 1995) and focuses on seven principal elements briefly explained below.

- A. Identification of Noise-Sensitive Land Uses
- B. Determination of Existing Noise Levels
- C. Prediction of Future Noise Levels
- D. Identification of Traffic Noise Impacts
- E. Identification and Consideration of Abatement
- F. Consideration of Construction Noise
- G. Coordination with Local Government Officials





Typically a highway noise study is designed to quantitatively analyze specific areas for noise impacts along one or more proposed Alternatives, each of which possess a clearly defined alignment with known horizontal and vertical geometry as well as a complete picture of the individual human occupied areas adjacent to the proposed roadway. The process begins by first identifying any and all locations where the proposed roadway would constitute an encroachment adjacent to developed and planned development areas involving human occupation.

The unit of measurement used in sound measurement is the decibel (dB). For traffic noise assessment the unit of measurement used is the A-weighted decibel scale (dBA), which most closely represents the response of the human ear to sound. The measurement most commonly used and adopted in Indiana is the Hourly Equivalent Sound Level, designated as  $L_{eq}(h)$ . This descriptor quantifies a noise-sensitive receiver's cumulative exposure from all noise-producing events over a one hour period.

Five Activity Categories described in Table 4.8.10 have been established by the FHWA to classify land use for the purposes of assessing impact and for the consideration of traffic noise abatement. The most common potential noise receiver anticipated for the US 31 project is the single family residence. However, schools, churches, public meeting centers, offices, and other types of properties frequented by people are also regarded as potential receiver sites in the US 31 study area. Although commercial businesses (typically assessed under Activity Category C) occur all along US 31 and achieve higher densities in southern South Bend, Lakeville, and LaPaz; these areas also have residential properties interspersed within the commercial operations. For this reason, the Category B criteria were used for the entire study area.

Table 4.8.10: Federal Highway Administration (FHWA) Noise Abatement Criteria (NAC)		
Activity Category	NAC, $L_{eq}(h)$	Description of Activity Category
A	57 dBA (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 dBA (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches libraries, and hospitals.
C	72 dBA (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	no NAC designated	Undeveloped lands.
E	52 dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

The assessment of potential highway traffic related noise impacts is accomplished by comparing the predicted future noise levels to the appropriate Noise Abatement Criteria (NAC) and existing noise levels. According to FHWA and INDOT policy, a highway traffic noise impact occurs when either of the following conditions is experienced at a sensitive receiver:

- The future predicted  $L_{eq}(h)$  noise level approaches or exceeds the appropriate NAC indicated in Table 4.8.10. INDOT has defined “approach” as meaning within 1 dBA of the NAC
- The future predicted  $L_{eq}(h)$  noise level substantially exceeds the existing ambient  $L_{eq}(h)$  noise level. INDOT defines substantial as 15 dBA or greater. Traffic-generated noise level increases of 15 dBA or more are typically associated with roadway improvements involving new alignment in rural areas

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Prediction of future noise levels at sensitive receivers along proposed alternatives was conducted using the FHWA Traffic Noise Model (TNM 2.1) computer program. The model spatially simulates the 3-D geometry of the proposed roadway and receiver location relative to the roadway, and accepts variable input concerning traffic volume, vehicle speed, vehicle composition (cars, trucks, etc.), terrain and surrounding landscape cover. Noise levels were predicted for the outdoor living areas at each sensitive receiver using the worst traffic conditions likely to occur on a regular basis for the design year (2030).

Future traffic-generated noise levels were predicted for the Alternatives Cs, Es, G-C and No-Build. Since the proposed alternatives would be fully controlled access facilities, the traffic volume from one interchange to the next is fixed. Therefore the proposed interchanges were used to define the beginning and end of discrete traffic volume segments throughout each of the alternatives.

The roadways in TNM 2.1 were constructed using a typical divided 4-lane section with two 12 foot lanes in each direction and a 60 foot median. In conducting this analysis the following data input variables and conditions had to be assumed or set to the TNM 2.1 default:

- roadways are on flat terrain
- receivers were vertically situated at-grade with the roadways
- for the existing conditions and the No-Build Alternative, US 31 is the sole source of highway noise traffic (no crossroads or potential frontage roads were included)
- no shielding from building rows or tree zones
- default ground type = lawn
- relative humidity = 50%
- temperature = 68° F

To establish typical baseline ambient sound levels within the study area, 43 field measurements were taken throughout the US 31 study area between US 30 and US 20. Residential properties randomly scattered along the existing US 31 facility, as well as representative residences within 800 feet of the three study alternatives, were sampled using a Larson-Davis DSP82 Type 1L sound level meter (serial no. 0152) according to procedures set forth in “Measurement of Highway-Related Noise” (Lee & Fleming, 1996). Table 4.8.11 shows the recorded data for existing conditions. Sound sources such as chirping birds, distant barking dogs, farm equipment in the background, and the occasional car or truck passing along the rural road were not excluded from the sampling since these sources are considered a part of the ambient noise environment.

Measurements taken at 13 properties along US 31 from US 30 up to US 20 ranged from 69.1 to 74.1 dBA, and therefore all exceeded the 67 dBA NAC under current conditions. Sampling of five residences near, but not along US 31 in South Bend ranged from 56.0 to 64.3 dBA. Each of these are not considered “first row” receivers (i.e., residences closest to the primary highway noise source), but have the potential to become “first row” receivers based on anticipated land acquisition and displacements to accommodate a 300 foot right-of-way through this portion of South Bend. The 25 suburban and rural measurements taken at residences that would be located adjacent to or near one or more of the proposed alternative alignments ranged from 43.4 to 62.8 dBA. The mean ambient sound level for the rural sites was 51.7 dBA, with a median value of 51.4 dBA.

Using TNM 2.1,  $L_{eq}$  noise levels at 771 receiver sites were modeled with base year 2002 traffic data. Under base year conditions, it is estimated that 446 of these sites (58%) currently experience traffic noise levels from US 31 that



approach, equal, or exceed the Category B NAC of 67 dBA. These sites are generally scattered all along existing US 31 with the greatest concentrations occurring within and around LaPaz, Lakeville, the south side of South Bend and the several small high density communities at US 31 crossroads. The number of receiver sites within the 66 to 78 dBA range is illustrated in Figure 4.8.32.

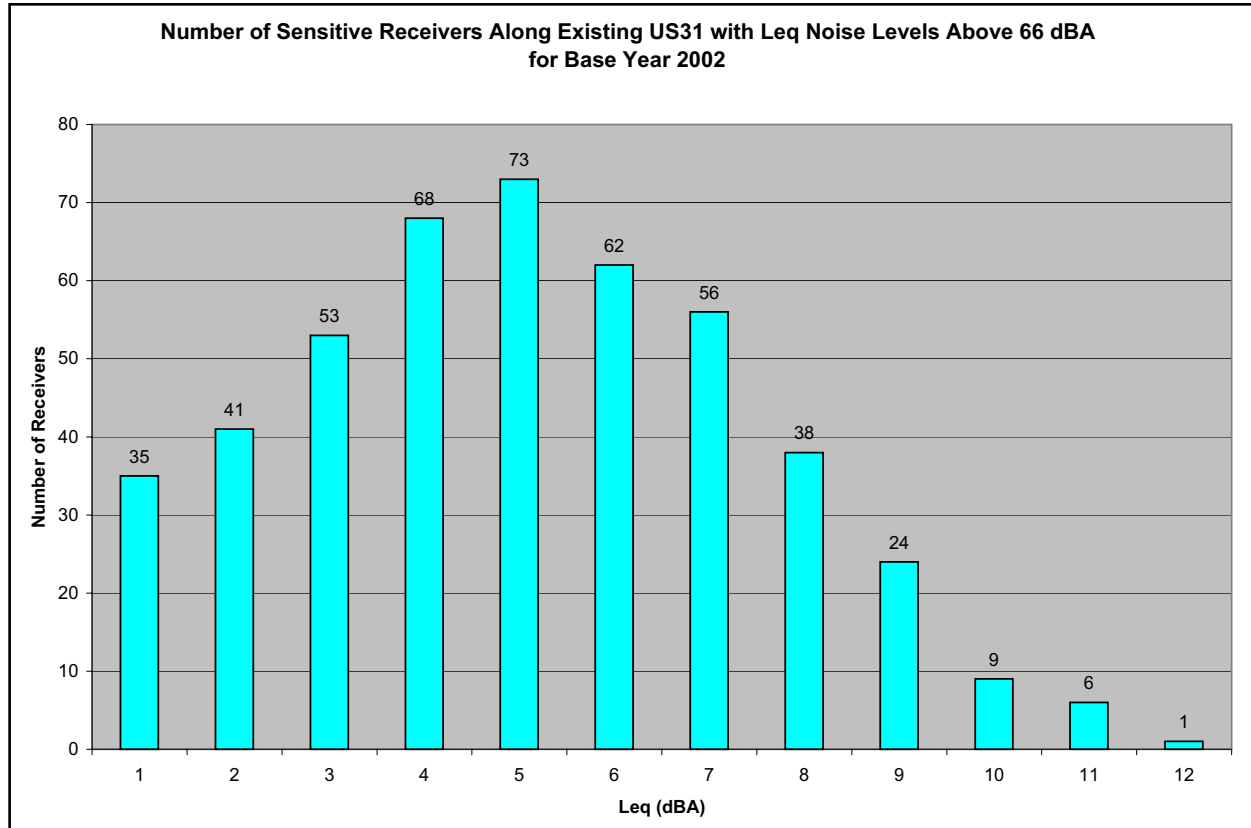


Figure 4.8.32: Number of Sensitive Receivers with Leq Noise Levels Above 66 dBA for Base Year 2002

Table 4.8.11: Ambient Field Noise Measurements for US31 Study Area

	Sample Site Location	US31	Alt. Cs	Alt. Es	Alt. G-C	L <sub>eq</sub> (h)
1	US 31 @ Plymouth Goshen Trail	X	X	X	X	69.1
2	US 31 N. of Third Road	X				71.0
3	US 31 in LaPaz	X				72.3
4	US 31 S. of Riley Road	X				70.1
5	US 31 near Pleasant Lake in Lakeville	X	X	X		69.6
6	US 31 @ Monroe St. in Lakeville	X				69.1
7	US 31 @ Cabot St. in Colburn	X				71.3
8	US 31 S. of New Road	X				70.5
9	US 31 S. of Miller Road	X				69.8
10	US 31 N. of Roycroft Drive	X				74.7
11	US 31 S. of Roosevelt Road	X			X	69.6



Table 4.8.11 Continued: Ambient Field Noise Measurements for US31 Study Area						
	Sample Site Location	US31	Alt. Cs	Alt. Es	Alt. G-C	Leq(h)
12	US 31 @ Weller Avenue	X				71.4
13	US 31 @ Detroit Avenue in South Bend	X		X		73.9
14	Main St. & Pulling St. in South Bend	X		X		59.5
15	Jewell St. E. of US 31 in South Bend	X		X		63.1
16	Main St. north of Jackson Rd. in South Bend	X	X	X	X	56.0
17	Jackson Ave. @ Clara Ave. in South Bend	X	X	X	X	60.2
18	Ruth Ave. E. of US 31 in South Bend	X		X		64.3
19	Hush Breeze Ct. in Whispering Hills Subdiv.		X		X	48.4
20	Dunwoody Ct. in Whispering Hills Subdiv.		X		X	44.4
21	Clover Hill Ct. N. of Kern Rd.		X		X	44.6
22	Old Spanish Tr. S. of Kern Rd.		X		X	49.0
23	Barber MHP on Locust Rd.		X			53.2
24	Roosevelt Rd. W. of US 31			X	X	45.3
25	Sun Communities MHP on Locust Rd.		X	X		46.3
26	Madison Rd. W. of US 31		X	X		48.4
27	Miller Rd. E. of US 31				X	51.9
28	Kenilworth Rd. N. of Osborne Rd.				X	56.3
29	Osborne Rd. E. of Kenilworth Rd.				X	53.8
30	Osborne Rd. W. of US 31 in Colburn		X	X		52.1
31	SR 4 W. of Mangus Rd.		X	X		62.8
32	SR 4 E. of Kenilworth Rd.				X	56.9
33	Quinn Rd. E. of Kenilworth Rd.				X	54.3
34	Lake Tr. E. of Kenilworth Rd.				X	51.4
35	Lilac Rd. S. of Leeper Rd.		X	X		48.9
36	Lilac Rd. @ Rankert Rd.		X	X		49.2
37	Tyler Rd. W. of Lilac Rd.		X	X	X	50.5
38	Tyler Rd. E. of Lilac Rd.				X	54.5
39	Kenilworth Rd. @ Rockstroh Rd.				X	55.0
40	First Rd. W. of Lilac Rd.		X	X	X	62.1
41	1B Rd. W. of Lilac Rd.		X	X	X	49.6
42	SR 6 W. of Lilac Rd.		X	X	X	60.2
43	Maple Rd. @ 3A Rd.		X	X	X	43.4



## 4.9 Natural Resources

### 4.9.1 Physiographic Regions

Physiographic regions are areas that have similar elevation, relief, and related types of topographic features present. These regions provide a general view of the terrain of an area, and what resources are present. The entire US 31 Improvement Project study area is within the **Northern Moraine and Lake Region**. This region covers about the northern quarter of Indiana. The majority of the state's natural lakes are within this region. Most of these lakes are small, occurring at terminal moraines. A moraine is an accumulation of earth and stones carried forward and deposited by a glacier. There are numerous outwash and lacustrine (associated with lakes, or ponds) plains, which are often characterized by wide marshes (many now drained), intersected by low sand ridges or knolls. Large, rugged moraines are common in this region (Mumford and Whitaker, 1982). Bogs and fens also occur in this portion of the state.

### 4.9.2 Natural Regions

A natural region is “a major, generalized unit of the landscape where a distinctive assemblage of natural features is present. It is part of a classification system that integrates several natural features, including climate, soils, glacial history, topography, exposed bedrock, pre-settlement vegetation, species composition, physiography, and plant and animal distribution, to identify a natural region” (Homoya, et al, 1985). Natural regions are similar to physiographic regions, but whereas physiographic regions may give information on predominant topography and land use, natural regions give more information about the native plant and animal species of an area.

The majority of the study area is within the **Northern Lakes Natural Region**. A small portion of the northwest corner of the study area is within the **Grand Prairie Natural Region**. There are no alternatives that go through the Grand Prairie Natural Region, and for this reason, it will not be discussed in detail in this Section. Figure 4.9.33 shows the study area and the natural regions in this portion of the state.

The following natural region descriptions are from “The Natural Regions of Indiana,” by Homoya et al. (1985).

There are numerous natural community types within the Northern Lakes Natural Region. They include: bogs, fens, marshes, prairie, sedge meadows, swamps, seep springs, lakes, and various deciduous forest types. Oak and hickory species, especially red oak, white oak, black oak, shagbark hickory, and pignut hickory dominate the dry and dry-mesic upland forests. Mesic sites characteristically have beech, sugar maple, black maple, and tulip tree as dominants. Floodplain forests typically include sycamore, American elm, red elm, green ash, silver maple, red maple, cottonwood, hackberry, and honey locust. Swamp communities commonly border lake and bog sites where red maple, silver maple, green ash, American elm, black ash, and locally yellow birch, are typical. Swamps dominated by black ash typically are associated with seep springs.

The Northern Lakes Natural Region is characterized by numerous freshwater lakes of glacial origin. Marsh communities are often associated with these lakes. Typical marsh species include swamp loosestrife, cattails, bulrush, marsh fern, marsh cinquefoil, and sedges, notably *Carex stricta* and *C. lasiocarpa*. In deeper water, distinctive species such as spatterdock, watershield, fragrant water-lily, pickerelweed, hornwort, wild celery, pondweeds, Virginia arrow-arum, and sedge occur. Figure 4.9.34 shows a wetland associated with Catfish Lake.



Figure 4.9.34: Wetlands by Catfish Lake in Northern Lakes Natural Region



## US 31 Plymouth to South Bend

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Figure 4.9.33



Bogs are more numerous in this natural region than any other. Bogs commonly consist of a floating mat of *Sphagnum* moss occupying a glacial depression. Characteristic bog plants include leatherleaf, cranberry, bog rosemary, pitcher plant, sundews, mountain holly, tamarack, Virginia chain fern, grass-pink orchid, rose pogonia orchid, sedges, poison sumac, and *Sphagnum* spp.

Wet sand flats and muck flats border some of the lakes and shallow basins. In some places, unique plant species of the Atlantic Coastal Plain disjuncts are associated with these communities. A disjunct species is one found growing in a natural setting separated by a relatively large distance from other populations of the same species.

Distinctive animal species of this natural region include the: spotted turtle, eastern massasauga rattlesnake, Blanding's turtle, star-nosed mole, cisco, marsh wren, swamp sparrow, and sandhill crane.

### 4.9.3 Soils and Geology

The topography in the study area is generally flat to gently rolling. Elevation ranges from 215 meters (705 feet) to 273 meters (895 feet) above sea level. This region was once covered by the Wisconsin glacier, and is now covered by a thick and complex deposit of glacial material. Glacial topography is also prominent, including knobs, kettles, kames, valley trains, and outwash plains (Homoya, et al, 1985).

There is a collection of fans and small ridges deposited during the last part of Wisconsin glaciation, formerly called the Maxinkukee Moraine, located in the northwestern portion of the study area. A fan is a feature created by deposition of sediment by streams. Fan formation is similar to delta formation; however, fans can form on land, such as outwash fans that form in front of glaciers. This area of complex glacial till is described in the Indiana Geological Survey (IGS) publication Miscellaneous Map 49 "Quaternary Geologic Map of Indiana," as "mixed drift; till and stratified drift in chaotic form." This area is a unique area both in terms of geology and ecology. It is described by the Indiana Department of Natural Resources as "one of the best examples of glacially formed landscapes in northern Indiana. Prominent features include knolls which rise 50 to 60 feet above their bases, numerous sloughs, enclosed basins, small lakes, and ponds" (IDNR, November 25, 1996).

The study area is underlain by Middle Devonian to Early Mississippian age bedrock, primarily Sunbury shale, Ellsworth shale, and Antrim shale. The Antrim shale is a dark brownish to black shale and is between 60 to 220 feet thick. The Ellsworth shale is 40 to 200 feet thick, and lies on top of the Antrim shale. The Ellsworth shale is dominated by alternating brownish and greenish layers in its lower portion, and greenish layers with some thin beds of dolomite in the upper portion. The Sunbury shale overlies the Ellsworth shale, and is dark brownish in color. It is slightly more than 10 feet thick in northeastern Indiana, and thins to the west and to the south (Camp and Richardson, 1999).

Soils in this area are diverse and may include: loamy soils in the moraine areas and till plains, neutral, clayey soils in moraine areas of the southeastern portion of this region, and sandy loam soils on the outwash deposits. Muck soils are those with a high organic component, formed partly or almost completely by the decomposed remains of woody or herbaceous vegetation. Muck soils are important components of some wetland communities, and are present in this region (Homoya, et al, 1985).

Soil characteristics such as drainage, permeability, depth to water table, depth to bedrock, compaction, shear strength, and shrink swell potential, can affect roadway design and construction. In particular, muck and peat soils require special engineering considerations. These soils must be excavated and filled in with an appropriate, more stable fill material. If they cover a large area, bridging may be necessary.



General soil associations within the study area were identified using United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) State Soil Geographic Database (STATSGO), and are listed below.

- **Coloma-Spinks-Oshtemo:** Deep, nearly level to strongly sloping, well-drained, coarse textured and moderately coarse textured soils on outwash plains and terraces
- **Coupee-Elston-Tracy:** Deep, nearly level to moderately sloping, well drained, medium textured and moderately coarse textured soils on outwash plains and terraces
- **Crosier-Brookston-Barry:** Deep, depressional and nearly level to gently sloping, somewhat poorly drained to very poorly drained, medium textured to moderately fine textured soils on till plains and lake plains
- **Gilford-Maumee-Sparta:** Deep, nearly level to strongly sloping, well-drained and excessively drained, moderately coarse textured and coarse textured soils on till plains, moraines, outwash plains, and terraces
- **Houghton-Adrian-Carlisle:** Deep, depressional and nearly level, very poorly drained, organic soils on lake plains, outwash plains, and till plains
- **Oshtemo-Kalamazoo-Houghton:** Nearly level to strongly sloping, well-drained, moderately coarse textured and coarse textured soils, some are deep and some are moderately deep over sand and gravel, on outwash plains and moraines
- **Riddles-Crosier-Oshtemo:** Deep, nearly level to strongly sloping, well-drained and somewhat poorly drained, medium textured and moderately fine textured soils on till plains
- **Wolcott-Odell-Corwin:** Deep, nearly level, very poorly drained and somewhat poorly drained, medium textured soils, on outwash plains, lake plains, and terraces

Figure 4.9.35 shows the general soil associations within the Study Area.

The Riddles-Crosier-Oshtemo association is the largest crossed by the alternatives, at roughly 40–45% of each alternative. Crosier-Brookston-Barry and Gilford-Maumee-Sparta were the second most common with roughly 20% each. Oshtemo-Kalamazoo-Houghton was third with roughly 10% of each alternative. Houghton-Adrian-Carlisle was the final association crossed by the alternatives, ranging from 3-8 %.

Many peat and marl pits exist in Marshall and St. Joseph counties, with additional mineral resources including sand and gravel, cement, gypsum, high silica sand, whetstone plants, and expanded shale. Some oil and gas exists in north central Marshall County (Wier and Patton, 1966).

#### 4.9.4 Terrestrial Wildlife and Habitat

Terrestrial wildlife and habitat in the study area will be discussed in two categories; General Habitat and Designated/Managed Habitat Areas. General habitat will refer to the general terrestrial habitat types found within the study area, while the Designated/Managed habitat areas are those that are designated or managed such that they provide habitat for wildlife. Habitat to be impacted within Designated/Managed Habitat Areas is discussed in the General Habitat section. For example, forest impact calculations also include forest within the Designated/Managed Habitat Areas. Wetlands and other aquatic habitats are discussed in separate sections in this document.

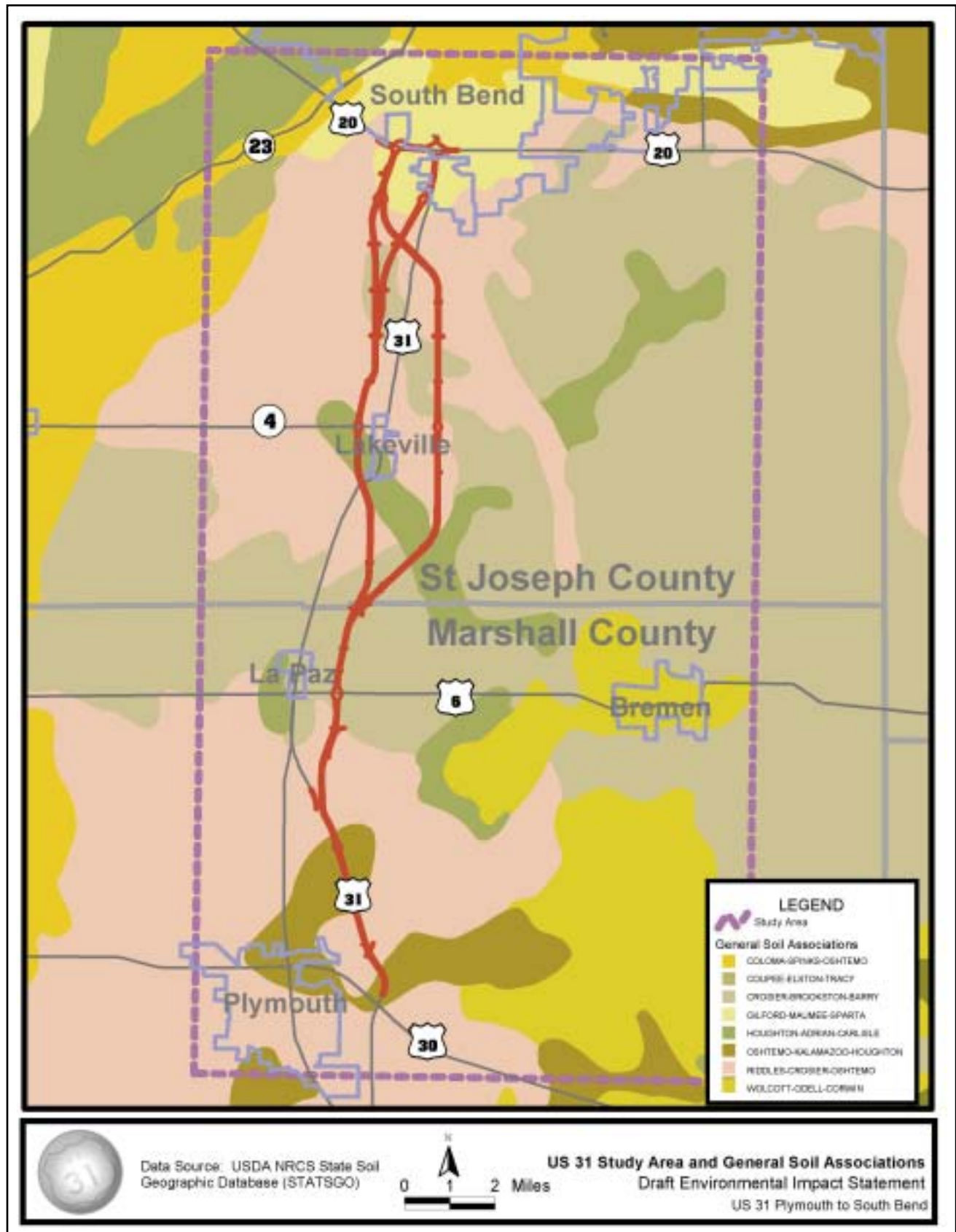


Figure 4.9.35: General Soil Associations





## General Habitat

Terrestrial habitats occurring within the project area include: forestland, shrub/herbaceous land, and pasture/crop/fallow land.

**Forestland.** As part of the Forest Inventory Analysis by the USDA in 1950, Indiana was divided into four forest survey units. These units have remained consistent throughout the years in order to more accurately track changes in forests from survey to survey. The study area is within the Northern Unit. The Northern Unit is the largest unit, comprising about 60% of the state; however, because much of the land use in this unit is agricultural, it has the lowest percentage of forestland (less than 10%). Due to its large size, the Northern Unit includes many types of growing conditions. The forests in this unit are predominately maple-beech (45%), oak-hickory (27%), and elm-ash-cottonwood (23%) (Tormoehlen et al., 2000).



Figure 4.9.36: Forested land in study area

Wooded areas are scattered throughout the study area. Generally, the larger, more contiguous forested areas were associated with the area of complex glacial drift in the northwestern portion of the study area. Typical canopy species in upland areas were sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), white oak (*Quercus bicolor*), northern red oak (*Quercus rubra*), bitternut hickory (*Carya cordiformis*), shagbark hickory (*Carya ovata*), sassafras (*Sassafras albidum*), eastern cottonwood (*Populus deltoides*), American basswood (*Tilia americana*), and common hackberry (*Celtis occidentalis*). Typical species in the upland shrub understory were American hornbeam (*Carpinus caroliniana*), staghorn sumac (*Rhus hirta*), pawpaw (*Asimina triloba*), red mulberry (*Morus rubra*), Japanese honeysuckle (*Lonicera japonica*), black raspberry (*Rubus occidentalis*), multiflora rose (*Rosa multiflora*), and greenbriar (*Smilax* sp.).

Typical herbaceous species in these areas were poison ivy (*Toxicodendron radicans*), clustered black snakeroot (*Sanicula odorata* = *Sanicula gregaria*), annual ragweed (*Ambrosia artemisiifolia*), white snakeroot (*Ageratina altissima* = *Eutatorium rugosum*), stinging nettle (*Urtica dioica*), Virginia creeper (*Parthenocissus quinquefolia*) and white heath aster (*Symphyotrichum ericoides* = *Aster ericoides*).

Typical canopy species in bottomland wooded areas were boxelder (*Acer negundo*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), swamp white oak (*Quercus bicolor*), pin oak (*Quercus palustris*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*). Typical bottomland shrub understory species were common elderberry (*Sambucus canadensis*), northern spicebush (*Lindera benzoin*), grapevines (*Vitis* sp.), and green briar (*Smilax* sp.). Typical herbaceous species were New England aster (*Aster noveboracensis*), common boneset (*Eupatorium perfoliatum*), jewelweed (*Impatiens capensis*), poison ivy (*Toxicodendron radicans*), American pokeweed (*Phytolacca americana*), whitegrass (*Leersia virginica*), great ragweed (*Ambrosia trifida*), stinging nettle (*Urtica dioica*), Canadian clearweed (*Pilea pumila*), smallspike false nettle (*Boehmeria cylindrica*), sweet woodreed (*Cinna arundinacea*), and Canadian woodnettle (*Laportea canadensis*).

The only riparian corridor observed was associated with the Yellow River in Marshall County. The existing US 31 crosses the Yellow River in this area. Typical canopy species in this area were green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), red maple (*Acer rubrum*), honey locust (*Gleditsia triacanthos*), box elder (*Acer negundo*), river birch (*Betula nigra*), Eastern cottonwood (*Populus deltoides*), and common hackberry (*Celtis occidentalis*). The shrub understory is represented by sandbar willow (*Salix exigua*), staghorn sumac (*Rhus hirta* = *Rhus typhina*), and red mulberry (*Morus rubra*).





Herbaceous species included crown vetch (*Coronilla varia*), eastern daisy fleabane (*Erigeron annuus*), annual ragweed (*Ambrosia artemisiifolia*), smallspike false nettle (*Boehmeria cylindrica*), poison ivy (*Toxicodendron radicans*), stinging nettle (*Urtica dioica*), great ragweed (*Ambrosia trifida*), jewelweed (*Impatiens capensis*), Canadian clearweed (*Pilea pumila*), wild yam (*Dioscorea villosa*), cocklebur (*Xanthium strumarium*), and creeping jenny (*Lysimachia nummularia*), broadleaf arrowhead (*Sagittaria latifolia*), swamp smartweed (*Polygonum hydropiperoides*), Pennsylvania smartweed (*Polygonum pennsylvanicum*), giant ironweed (*Veronia gigantea*), purplestem beggartick (*Bidens connata*), cutleaf coneflower (*Rudbeckia laciniata*), white snakeroot (*Ageratina altissima* = *Eupatorium rugosum*), grapevine (*Vitis* sp.), goldenrod (*Solidago* sp.), Canada germander (*Teucrium canadense*), and reed canary grass (*Phalaris arundinacea*).



Figure 4.9.37: Yellow River Riparian Corridor

Appendix E contains a list of plant species observed while walking the alternatives in the late summer and fall. Appendix F contains a list of plant species reported in St. Joseph and Marshall counties by and Deam (1974).

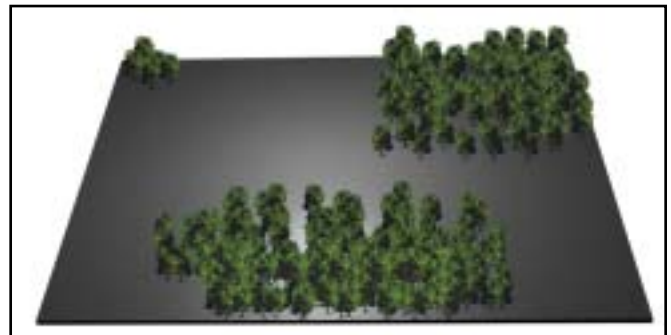


Figure 4.9.38: Left: Forest Prior to Fragmentation. Right: Forest After Fragmentation

In addition to impacts from the direct taking of land, ecosystems such as forests, prairies (remnants), wetlands and others may be adversely affected by habitat fragmentation. Habitat fragmentation is perhaps the most pervasive type of habitat alteration taking place in the world today. It can be defined as the steady transformation of once large and continuous tracts of natural landscape into smaller and more isolated patches or fragments surrounded by disturbed areas (Temple and Wilcox, 1986). Figure 4.9.38 shows a forest before fragmentation and one after fragmentation occurs. Fragmentation can increase the likelihood of invasive species entering an area remaining habitat. Invasive plant species can cause ecological damage by displacing native plant species, eliminating food and cover for wildlife, and threatening rare plant and animal species. The Invasive Plant Species Assessment Working Group (IPSAWG) was formed in order to combat invasive species in Indiana. A number of agencies and organizations, including INDOT, participate in this group.

Core habitat is the interior portion of any particular habitat. Habitat fragmentation and core habitat can be associated with different ecosystem types, such as forest and prairies.

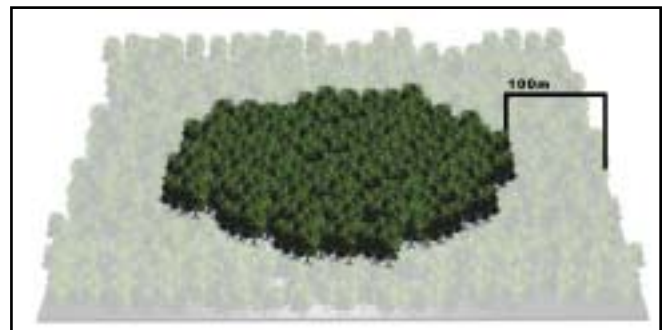


Figure 4.9.39: Diagram of Core Forest Habitat



However, in Indiana most core habitat is generally associated with forests because no large tracts of prairie remain, usually only remnants. Core forest is generally accepted to be the portion of the forest that is 100 meters from the edge (Temple, 1986). The outer portion of forest is considered the edge habitat. Figure 4.9.39 diagrams core forest habitat.

**Shrub/Scrub Land.** Shrub/scrub areas are those that do not have a canopy, but are in the early stages of succession towards a forest community. This habitat type provides some cover, foraging, and breeding opportunities for wildlife. Woody and herbaceous species typically found in shrub/scrub areas include Queen Anne's lace (*Daucus carota*), Indian hemp (*Apocynum cannabinum*), common milkweed (*Asclepias syriaca*), staghorn sumac (*Rhus hirta*= *Rhus typhina*), giant ironweed (*Veronia gigantea*), red maple (*Acer rubrum*), red mulberry (*Morus rubra*), American pokeweed (*Phytolacca americana*), reed canary grass (*Phalaris arundinacea*), and Canada goldenrod (*Solidago canadensis*).



Figure 4.9.40: Field of Goldenrod in the Study Area

**Pasture/Crop/Fallow Land.** Vegetation on tilled or active cropland is primarily soybeans, corn, and winter wheat for much of the growing season in the study area. Due to the disturbance of the land by agricultural practices and grazing, there is limited cover, foraging, and breeding habitat for wildlife species. Typical plant species observed in these areas were common dandelion (*Taraxacum officinale*), chufa flatsedge (*Cyperus esculentus*), black medick (*Medicago sativa*), red clover (*Trifolium pretense*), white clover (*Trifolium repens*), common moonseed (*Menispermum canadense*), orchard grass (*Dactylis glomerata*), barnyard grass (*Echinochloa crus-galli*), annual ragweed (*Ambrosia artemisiifolia*), great ragweed (*Ambrosia trifida*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), chicory (*Cichorium intybus*), curly dock (*Rumex crispus*), rough cocklebur (*Xanthium strumarium*), ivy-leaf morning glory (*Ipomoea hederacea*), tall morning glory (*Ipomoea purpurea*), and perennial pea (*Lathyrus latifolius*).



Figure 4.9.41: Soybean field in Study Area

**Designated/Managed Habitat Areas.** In addition to general types of wildlife habitat, some areas have been identified by state agencies or managed such that they provide wildlife habitat. Such areas include Potato Creek State Park, IDNR Notable Wildlife Habitat Areas, Classified Wildlife Areas, Classified Forests, Partners for Fish and Wildlife, Conservation Reserve Program Lands, and Wetland Reserve Program Lands.

**Potato Creek State Park and Swamp Rose Nature Preserve.** Potato Creek State Park includes approximately 3,840 acres of forest, wetlands, prairie, and the 327-acre Worster Lake. This park is located in the far western portion of the study area on SR4, and offers a number of recreational opportunities, as well as a variety of natural areas. There is an active resource management program in place to restore and maintain natural areas to conditions found prior to European settlement. Wetland types such as sedge meadows, shallow marshes, swamps, and beaver ponds are being restored and maintained. Native prairie plantings are being conducted, and prairie areas are being maintained by periodic, controlled burnings. Other areas in the park are being allowed to grow into hardwood forests. The Swamp Rose Nature Preserve is located in the northeast section of the park. The preserve contains an area that provides an example of eutrophication, where a lake has slowly filled in, over hundreds of years, to become a wetland. A number of rare plant species are found in the nature preserve. The state park and nature preserve provide habitat to a number of wildlife species such as songbirds, raccoon, fox, coyote, turkey, and beaver.



**Notable Wildlife Habitat (Identified by the IDNR).** Notable wildlife habitat areas were identified by the IDNR and provided on a map during an interagency meeting and bus tour on May 15, 2003. These areas were identified as providing very good habitat for a variety of wildlife species, or having unique plant species. The majority of these areas are forest or wetland communities, and are located in the northwestern portion of the study area. Many are west of US 31 and north of Lakeville, and correspond with the area of complex glacial drift, formerly the Maxinkukee Moraine.

**Classified Wildlife Habitats.** The Classified Wildlife Habitat Program is administered by the IDNR, and was created to encourage landowners to develop, save, and maintain quality wildlife habitat. Landowners enrolled in the program receive property tax reductions, a wildlife management plan specifically tailored to meet the habitat and management needs of the wildlife species of interest, and free technical advice and assistance. As part of the program, the landowner must carry out minimum standards of wildlife management as specified in their management plan. Prescribed habitat management practices may include: the periodic use of strip disking, strip mowing, prescribed burning, food plot rotation, legume inter-seeding, timber harvesting, woodland regeneration cuts, water level manipulation, and other practices designed to control natural succession and maintain quality habitat.

**Classified Forests.** The Classified Forest Program is designed to keep Indiana's private forests intact. This program is administered by the IDNR Division of Forestry. This program allows landowners with at least ten acres of forest to set it aside and to remain as forest. Landowners enrolled in the program receive property tax reductions, forestry literature, and periodic free inspections by a professional forester. Classified Forests must be protected from livestock. Landowners must follow minimum standards of good timber management as prescribed by the IDNR district forester.

**Conservation Reserve Program (CRP) and Wetlands Reserve Program (WRP).** The Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and other natural resource concerns on their lands. This program helps to reduce soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. The Wetlands Reserve Program (WRP) provides technical and financial assistance to eligible landowners who would like to restore, and enhance wetlands on their property. It is discussed in this section, rather than the Section 4.12, Wetlands due to its similarity with the CRP. The goal of the WRP wetland restoration efforts is to achieve the greatest wetland functions and values, along with the optimum wildlife habitat. Both the CRP and WRP are administered by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).

**Partners for Fish and Wildlife Program.** The Partners for Fish and Wildlife Program is administered by the United States Fish and Wildlife Service (USFWS) and is a voluntary program providing financial and technical assistance to private landowners who wish to restore fish and wildlife habitats on their property. The restoration of degraded wetlands, native grasslands, streams, riparian corridors, and other habitats to their natural condition is emphasized.

**Wildlife Species Observed in the Study Area.** The following wildlife species were observed within the study area while doing field work: wild turkey (*Meleagris gallopavo*), whitetail deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), great blue heron (*Ardea herodias*), ring-necked pheasant (*Phasianus colchicus*), spotted salamander (*Ambystoma maculatum*), and redback salamander (*Plethodon cinereus*). Property owners in the study area also report the dickcissel (*Spiza americana*), bobolink (*Dolichonyx oryzivorus*), meadowlark (*Sturnella* sp.), American kestrel (*Falco sparverius*), and green heron (*Butorides virescens*) in the study area. Appendix F contains lists of fishes, mammals, birds, reptiles, and amphibians reported from St. Joseph and Marshall counties. Those federal or state listed threatened and endangered species are discussed separately in Section 5.9.5, Threatened and Endangered Species.





## 4.9.5 Threatened and Endangered Species

Endangered and threatened species are recognized by federal and state agencies as being in danger of extinction or being sufficiently compromised that they are at risk of becoming endangered, either nationally or within a state. The assessment of endangered and threatened species is concerned with the preservation and conservation of such species and their sustainability. The following federal and state definitions for threatened, endangered, special concern, and extirpated species are provided:

### **Federal Classifications:**

<b>Endangered (E)</b>	Any species that is in danger of extinction throughout all or a significant portion of its range.
<b>Threatened (T)</b>	Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
<b>Candidate (C)</b>	Any species that the United States Fish and Wildlife Service (USFWS) has sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened.

### **Indiana State Classifications:**

<b>Endangered (E)</b>	Any animal or plant species whose prospects for survival or recruitment within the state are in immediate jeopardy and are in danger of disappearing from the state. This includes all species classified as endangered by the federal government which occur in Indiana.
<b>Threatened (T)</b>	Any animal or plant species likely to become endangered within the foreseeable future. Plants known to occur currently on 6 to 10 sites are considered threatened.
<b>Special Concern (SSC)</b>	Any animal or plant species about which some problems of limited abundance or distribution in Indiana are known or suspected and should be closely monitored.
<b>Extirpated (X)</b>	Any animal or plant species that has been absent from Indiana as a naturally occurring population for more than 15 years.

Federally listed species are protected under Section 7 of the Endangered Species Act (ESA). This section directs all Federal agencies to use their existing authorities to conserve threatened and endangered species, and in consultation with the United States Fish and Wildlife Service (USFWS), to ensure that their actions do not jeopardize the continued existence of listed species or significantly impact or adversely modify critical habitat.

Critical habitat is defined as a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. There is no designated critical habitat within the study area.

Table 4.9.12 summarizes the identified federal and state listed threatened, endangered, or special concern species that may be present in the study area. These species were identified through coordination with the United States Fish and Wildlife Service (USFWS), the Indiana Department of Natural Resources (INDR) Indiana Natural Heritage Data Center, expert opinion, and property owners within the study area. Only recent (1980+) records from the Indiana Natural Heritage Data Center were used. Habitat requirements and the probability of occurrence in the study area are also listed. All federally listed species are also state listed. Potential impacts to these species are discussed in more detail in Section 5.9.5, Threatened and Endangered Species.



Table 4.9.12: Summary of Threatened and Endangered Species Possibly Present in US 31 Study Area

Species	Common Name	State Status *	Federal Status **	State Rank ***	Global Rank ****	Preferred Habitat	Probability of Occurrence Within the Preferred Alternative
<b>Gastropods</b>							
<i>Campeloma decisum</i>	Pointed Campeloma	SSC	-	S2	G5	Streams, lakes, and ponds, burrows in mud	Low - Little to no preferred habitat loss
<i>Lymnaea stagnalis</i>	Swamp Lymnaea	SSC	-	S2	G5	Permanent & semipermanent aquatic habitats	Low - Little to no preferred habitat loss
<b>Amphibians</b>							
<i>Acris crepitans blanchardi</i>	Blanchard's Cricket Frog	**	-	S?	G5	Water with an open canopy with low emergent vegetation, such as ponds, ditches, wet prairies, marshes and fens near permanent or flowing water	Moderate - Suitable habitat observed on-site
<i>Ambystoma laterale</i>	Blue-spotted Salamander	SSC	-	S2	G5	Deciduous and coniferous forest; beneath logs, rocks, leaf litter, or in burrows of other small animals; require ponds in midsummer for breeding	Moderate - Suitable habitat observed on-site
<b>Reptiles</b>							
<i>Clemmys guttata</i>	Spotted Turtle	E	-	S2	G5	Shallow, well vegetated wetlands with soft substrates such as marshes, wet pastures, bogs, fens, swamps, woodland streams, and drainage ditches	Low - Limited preferred habitat impacted by project
<i>Clonophis kirtlandii</i>	Kirtland's Snake	E	-	S2	G2	Moist to wet grassy areas such as wet meadows, wet prairies, fens, and grasslands that are near waterbodies such as open and woodland ponds, streams and marshes; may be found in residential or urban areas under boards and trash	Low - Limited preferred habitat impacted by project
<i>Emydoidea blandingii</i>	Blanding's Turtle	E	-	S2	G4	Marshes, creeks, wet prairies, sloughs, fens, and edges of lakes and ponds; prefer shallow systems, clean water, soft organic substrates, and reasonably dense aquatic vegetation	Moderate - Suitable habitat observed on-site
<i>Nerodia erythrogaster neglecta</i>	Northern Copperbelly Water Snake	E	T	S2	G5, T2, T3	Use multiple wetlands, frequently moving between them; prefer shallow edges of open water wetlands, ponds, or lakes, shrubby swamps, shallow woodland ponds, and slow moving streams associated with floodplain woods; also use uplands, particularly in summer	Low - Limited preferred habitat impacted by project





Table 4.9.12 Continued: Summary of Threatened and Endangered Species Possibly Present in US 31 Study Area

Species	Common Name	State Status *	Federal Status **	State Rank ***	Global Rank ****	Preferred Habitat	Probability of Occurrence Within the Preferred Alternative
<i>Thamnophis butleri</i>	Butler's Garter Snake	E	-	S1	G4	Moist, grassy, open canopy areas, such as meadows, wet prairies, marshes, savanna, and grasslands; may also be found in grassy vacant lots in suburban areas; often under rocks, logs, trash and boards	Low - Limited preferred habitat impacted by project
<i>Sistrurus catenatus catenatus</i>	Eastern Mas-sasauga	E	C	S2	G3, G4, T3, T4	Sphagnum bogs, fens, swamps, marshes, shrub-dominated peatlands, wet meadows, floodplains, dry woodland, seasonal wetlands with mixture of open grass-sedge areas and short closed canopy	Low - Limited preferred habitat impacted by project
<b>Birds</b>							
<i>Ardea alba</i>	Great Egret	SSC	-	S1B, SZN	G5	Shores of lakes, ponds, and rivers; freshwater or saltwater marshes, mudflats, shallow lagoons, estuaries; requires trees or shrubs near water for nesting	Low - Limited preferred habitat impacted by project
<i>Botaurus lentiginosus</i>	American Bittern	E	-	S2B	G4	Shallow or deep water emergent wetlands, with tall, dense vegetation; wet meadows; tall dense vegetation in uplands adjacent to wetlands	Moderate - Suitable habitat observed on-site
<i>Certhia americana</i>	Brown Creeper	**	-	S2B, SZN	G5	Deciduous and mixed forest, often forested floodplains; prefer to nest in dead or dying trees with peeling bark	Low - Limited preferred habitat impacted by project
<i>Chlidonias niger</i>	Black Tern	E	-	S1B, SZN	G4	Freshwater marshes and sloughs with tall, dense marsh vegetation and areas of open water	Very Low - migratory species and little to no preferred habitat loss
<i>Circus cyaneus</i>	Northern Harrier	E	-	S2	G5	Tall, dense vegetation in wet or dry grasslands, wetlands, lightly grazed pastures, croplands, fallow fields and brushy areas, coastal or inland areas	Moderate - Suitable habitat observed on-site
<i>Grus canadensis</i>	Sandhill Crane	E	-	S2B, SZN	G5	Open freshwater, marshes, bogs, sedge meadows, fens	Very Low - migratory species and little to no preferred habitat loss
<i>Haliaeetus leucocephalus</i>	Bald Eagle	E	T	S2	G4	Mature forests near large bodies of water.	Very Low - suitable habitat not observed on-site



Table 4.9.12 Continued: Summary of Threatened and Endangered Species Possibly Present in US 31 Study Area

Species	Common Name	State Status *	Federal Status **	State Rank ***	Global Rank ****	Preferred Habitat	Probability of Occurrence Within the Preferred Alternative
<i>Mniotilta varia</i>	Black-and-White Warbler	SSC	-	S1, S2B	G5	Primary and secondary deciduous or mixed forest	Low - Limited preferred habitat impacted by project
<i>Rallus limicola</i>	Virginia Rail	SSC	-	S3B, SZN	G5	Freshwater marshes with cattails or other dense vegetation	Moderate - Suitable habitat observed on-site
<i>Xanthocephalus xanthocephalus</i>	Yellow-Headed Blackbird	E	-	S1B	G5	Freshwater marshes in summer, forages in open, cultivated fields and pastures during migration	Very Low - suitable habitat not observed on-site
<b>Mammals</b>							
<i>Condylura cristata</i>	Star-nosed Mole	SSC	-	S2	G5	Marshes, bogs, ditch and stream banks, swamps	Moderate - Suitable habitat observed on-site
<i>Myotis sodalis</i>	Indiana Bat	E	E	-	-	Hibernaria are in caves and mines; maternity and foraging habitat is located near small stream corridors with well-developed riparian woods; and upland forests.	Moderate - Suitable summer habitat observed on-site
<i>Lynx rufus</i>	Bobcat	E	-	S1	G5	Forest, scrub, or grassy areas in Indiana; has adapted to swamp and desert in other parts of the county	Very Low - Suitable habitat not observed on-site.
<i>Taxidea taxus</i>	American Badger	E	-	S2	G5	Open areas such as prairie, fallow fields, old gravel pits, stream corridors, railroad right-of-way, and edge of woods	Moderate - Suitable habitat observed on-site
<b>Plants</b>							
<i>Geranium robertianum</i>	Herb-Robert	T	-	S2	G5	Ravines and rocky woods	Very Low - suitable habitat not observed on-site.
*State Status - X = extirpated, E = endangered, T = threatened, R = rare, SSC = special concern, WL = watch list, SG = significant, ** = no status but rarity warrants concern. Indiana Department of Natural Resources, Division of Nature Preserves Web Site - <a href="http://www.ai.org/dnr/naturepr/species/index.htm">http://www.ai.org/dnr/naturepr/species/index.htm</a> (November, 2002).							
**Federal Status - E = endangered, T = threatened, LE = different listings for specific ranges of species, C = Candidate for listing, e/sa = appearance similar to a listed endangered species, - = not listed							
***State Rank - SX = presumed extirpated, SH = possibly extirpated, S1 = critically imperiled, S2 = imperiled, vulnerable, S4 = apparently secure, S5 = secure, SR = reported, SZ = migratory transient, SE = exotic, S? = unranked, SU = unrankable							
****Global Rank - GX = presumed extirpated, GH = possibly extirpated, G1 = critically imperiled, G2 = imperiled, vulnerable, G4 = apparently secure, G5 = secure, GR = reported, GZ = migratory transient, GE = exotic, G? = unranked, GU = unrankable							



**Wetland, Habitat and Trophic Response Guilds.** As part of a separate project, wetland, habitat and trophic response guilds were developed for all reasonable resident and migrant species occurring in Indiana based on a literature review and field experience. Rankings were coded so as to emphasize wildlife species and their sensitivity or tolerance to anthropogenic (man-made) disturbances in aquatic and terrestrial habitats. This database provides valuable information about the habitat, feeding, movement, status and sensitivity for adaptability of each species.

The categories used are shown in Table 4.9.13. They are 1) wetland or aquatic dependency, 2) habitat specificity, 3) trophic level, 4) seasonality (birds only), and 5) species status. In addition, birds that are sensitive to forest and grassland (prairie) fragmentation, and tolerance levels for fishes are included for reference. Ranking of species in standardized guilds provides a way to compare structural and functional changes in wildlife communities affected by various types of environmental impacts.

Table 4.9.13: Ranking scores for response guilds of wildlife communities	
	Code
<b>1. WETLAND DEPENDENCY</b>	
obligate species (found >99% in wetlands)	5
facultative wet (57-99%, generally found in or near wetlands)	3
facultative (34-66%, occurs frequently, but not essential)	1
facultative dry (1-33%, occasional or no use)	0
upland (>99% in uplands)	0
<b>2. HABITAT SPECIFICITY</b>	
alpha species -- stenotypic, specialist (e.g., large tree cavity nester, clear water)	5
gamma species -- landscape dependent (e.g., undisturbed forest in Indiana, affected by changes in land use, wide-ranging)	3
beta species -- generalist, edge, disturbance	1
<b>3. TROPHIC LEVEL</b>	
carnivore, specialist (restricted diet)	5
carnivore, generalist	4
herbivore, specialist (e.g., nuts, nectar)	3
herbivore, generalist	2
omnivore (exists on either plants or animals)	1
<b>4. SEASONALITY (birds only)</b>	
breeding season resident/neotropical migrant	5
short-distance migrant	4
year round resident	3
non-breeding season resident only	2



Table 4.9.13 Continued: Ranking scores for response guilds of wildlife communities	
	Code
migratory transient	1
Occasional	0
<b>5. SPECIES STATUS</b>	
endangered, threatened, special concern, watch list, and endemic	5
commercial, recreational value	3
other native species	1
Exotics	0

This database of mammals, birds, reptiles, amphibians, and fishes occurring in Indiana includes a sample size of 606 species based on guild rankings. Results show about 47% of 57 mammals, 62% of 282 birds, 43% of 53 reptiles, 100% of 38 amphibians, and 100% of 176 fishes could be categorized as being partially or fully dependent upon wetlands and/or associated aquatic habitats.

Of these 606 vertebrates, approximately 73% are fully or partially wetland dependent. In addition, 93 of 120 (78%) of the TES (including watch list species) are wetland dependent. Wetlands make up only 4-5% of the surface area of Indiana and such high occurrences of TES species for wetlands shows the value and importance of wetland habitats to Indiana's biota. The remaining 27 TES species may be categorized as grassland species (14), forest species (10), cave species (2), or reintroduced (1).

Table 4.9.14 lists those vertebrate threatened, endangered, and special concern species that may be within the US 31 study area and their ranking scores for response guilds. These species are similar to those for the entire state, with 73% being fully or partially wetland dependent. Species not dependent on wetlands are often sensitive to forest fragmentation.

Appendix G contains response guild ranking scores for the vertebrates of Indiana.

Table 4.9.14: Response Guilds for Threatened, Endangered, and Special Concern Species					
Species	Wetland Dependence	Habitat Specificity	Trophic Level	Seasonality (Birds Only)	Status
<i>Acris crepitans blanchardi</i> (Blanchard's cricket frog)	3	1	4	-	5
<i>Ambystoma laterale</i> (Blue-spotted salamander)	3	3	4	-	5
<i>Clemmys guttata</i> (Spotted turtle)	5	3	1	-	5
<i>Clonophis kirtlandii</i> (Kirtland's snake)	3	3	4	-	5
<i>Emydoidea blandingii</i> (Blanding's turtle)	5	5	4	-	5



Table 4.9.14 Continued: Response Guilds for Threatened, Endangered, and Special Concern Species

Species	Wetland Dependence	Habitat Specificity	Trophic Level	Seasonality (Birds Only)	Status
<i>Nerodia erythrogaster neglecta</i> (Northern copperbelly water snake)	5	3	4	-	5
<i>Thamnophis butleri</i> (Butler's garter snake)	0	3	4	-	5
<i>Sistrurus catenatus catenatus</i> (Eastern massasauga rattlesnake)	5	5	4	-	5
<i>Ardea alba</i> (Great egret)	5	5	4	4	5
<i>Botaurus lentiginosus</i> (American bittern)	5	3	4	5	5
<i>Certhia americana</i> * (Brown creeper)	1	5	4	3	5
<i>Chidonias niger</i> (Black tern)	5	3	4	5	5
<i>Circus cyaneus</i> ** (Northern harrier)	3	3	4	3	5
<i>Grus canadensis</i> (Sandhill crane)	5	3	1	1	5
<i>Haliaeetus leucocephalus</i> (Bald eagle)	5	5	4	3	5
<i>Mniotilta varia</i> * (Black-and-white warbler)	0	3	4	5	5
<i>Rallus limicola</i> (Virginia rail)	5	3	1	5	5
<i>Xanthocephalus xanthocephalus</i> Yellow-headed blackbird	3	3	1	0	5
<i>Condylura cristata</i> (Star-nosed mole)	5	5	4	-	5
<i>Myotis sodalis</i> (Indiana bat)	1	5	5	-	5
<i>Lynx rufus</i> (Bobcat)	0	3	4	-	5
<i>Taxidea taxus</i> (American badger)	0	3	4	-	5
* Denotes sensitive to forest fragmentation **Denotes sensitive to prairie and grassland fragmentation					





## 4.10 Water Resources

### 4.10.1 Surface Water

Surface water features in the project area include flowing creeks and streams as well as ponded water in both naturally occurring and man-made lakes. In addition, wetland complexes are extensive within the depressional landscape of the project area (see Section 4.12, Wetlands).

The project area is in the Kankakee and St. Joseph River watersheds in Marshall and St. Joseph counties. This project area is drained by two major river systems. The St. Joseph River and its tributaries drain the extreme northern portion of the project area and drains into Lake Michigan. The Yellow River and its tributaries drain the majority of the project area to the south. The Yellow River flows into the Kankakee River which discharges into the upper Mississippi River Basin. Tributaries within the project area include Elmer Seltenright Ditch, Lehman Ditch, Heston Ditch, Shidler-Hoffman Ditch, and Bunch Ditch within the Kankakee River watershed, all of which drain to the Yellow River. Within the St. Joseph River watershed, the primary tributaries in the project area are Auten Ditch and Phillips Ditch.

Some of the larger natural lakes within the project area include Pleasant Lake, Riddles Lake, Wharton Lake, Moon Lake, and Catfish Lake. Heston Ditch flows through Moon Lake, Pleasant Lake, and Riddles Lake the largest lakes in the project area. These three lakes are in the vicinity of Lakeville.

The geologic history of the Kankakee River Basin played a role in the formation of the current characteristics of the area. Glaciers flattened the region while moraines formed by the melting ice caused the basin to be lower than surrounding areas. Much of the lowland became a gigantic marsh as sand was deposited by the melting glacier. A system of ditches was dug throughout the basin beginning in the middle 1800s to improve the drainage for farming. Most of the streams in the basin have been dredged and or straightened. The basin is still flood-prone, but is extensively farmed (Indiana Department of Environmental Management, 1989). The majority of the primary tributaries listed above are considered legal drains by the Marshall and St. Joseph County Surveyor's Offices and are regulated and maintained for drainage by the respective County Drainage Boards.

A review of the IDEM 2002 303(d) list of impaired water bodies and the 2001 305(b) Report on Water Quality for the Lower Wabash and Upper Illinois watersheds identified three streams within the project area that do not meet water quality standards for one or more designated uses. These water bodies require the development of Total Maximum Daily Loads (TMDLs) for specified pollutants to alleviate the impairment of the waterbody. The TMDL is the maximum amount of a pollutant that can be discharged over the entire watershed for the specific stream and allow the stream to maintain water quality standards. The streams identified include the Yellow River-Milner Seltenright Ditch, Elmer Seltenright Ditch Headwaters, and the Aldrich Ditch-Schang Ditch (also identified as East Branch of Bunch Ditch). All three of these water bodies are within the Kankakee River watershed.

The Yellow River-Milner Seltenright Ditch includes the main stem of the Yellow River where it is crossed by the existing US 31 and is listed as impaired for *E. coli*. This section is non-supporting for primary contact recreation for 16.91 miles. The Elmer Seltenright Ditch Headwaters is located in northern Marshall County just south of LaPaz. This section is listed as partially supporting aquatic life for 3.85 miles with a moderate rating for the biotic community status. The Aldrich Ditch-Schang Ditch is located in southern St. Joseph and northern Marshall counties flowing generally north to south 1.5 to 2 miles east of existing US 31. This stream is listed as impaired for 12.06 miles for partially supporting aquatic life with a moderate rating for the biotic community status.



## 4.10.2 Groundwater

Bedrock geology in St. Joseph County is primarily Mississippian rocks, while Marshall County is primarily Devonian and Mississippian shale (Gutschick, 1966). Below the Wisconsin and Illinoian glacial materials are bedrock formations of Mississippian, Devonian, and Silurian ages. Bedrock aquifers are not considered an important source of water in this area due to their depth, low-yielding character and the occurrence of good aquifers in the glacial drift. The major sources of ground water are contained in the glacially derived unconsolidated deposits, which are of particular importance in the region (Clark, 1980). Unconsolidated glacial deposits in the project area range from 150 to 300 feet thick. Wells are typically in sand or gravel formations in the drift and can be less than 50 feet deep to greater than 400 feet deep. Well yields are as high as 1,400 gallons per minute (gpm), but maximum expected yields are up to 600 gpm.

The southern portion of the project generally follows the boundary between the Maxinkuckee Moraine Aquifer System and the Nappanee Aquifer System, while the northern portion of the project area is within the boundary of the Hilltop Aquifer System in the St. Joseph watershed. The Maxinkuckee Moraine Aquifer System is composed of a complex structure of thin sand and gravel lenses within a thick till deposit including locally thick surficial deposits of coarser grained material. Most of the aquifers range from 3 to 35 feet thick. Depending on local conditions, the aquifer system ranges from moderately to highly susceptible to surface contamination. The Nappanee Aquifer System is also composed of thin (3 to 10 feet) lenses of sand and gravel within a thick till deposit. The Nappanee Aquifer System is only slightly susceptible to surface contamination except where surface sand and gravel deposits exist. The Hilltop Aquifer System is a sand and gravel rich system. The majority of the aquifers range from 10 to 80 feet thick with considerable variability from north to south across the aquifer system. The Hilltop Aquifer System is susceptible to groundwater contamination due to its sand and gravel rich nature. However, the area has only moderate groundwater availability (25 to 150 gpm).

Groundwater resources throughout the project area are extensively developed for drinking water supplies. Groundwater is the drinking water source for 96-100% of the population in Marshall and St. Joseph counties (Bechert and Heckard, 1966). A sole source aquifer has been identified by the Environmental Protection Agency in the St. Joseph Aquifer System. The boundary of the Sole Source Aquifer Designated Area includes South Bend and Elkhart along the St. Joseph River and has several fingers that extend to the southeast from Elkhart along the Elkhart River, Turkey Creek and the Little Elkhart River. This aquifer boundary is just north of the US 31 project area. Several public water system wells are located within the project area including utilities for the city of Lakeville and several mobile home parks. In addition, numerous private wells also exist.

## 4.11 Floodplains

A floodplain is defined as the area around a stream or river that frequently floods during heavy rain. The 100-year floodplain was analyzed for this project using digital general floodplain maps of Indiana and Flood Insurance Rate Maps (FIRM). This is the area around the streams and rivers that will be under water whenever the 100-year storm occurs. Floodplains are composed of two general areas (see Figure 4.11.42). The first area is the floodway, which is the channel of a river or stream and those portions of the floodplain adjoining the channel which are reasonably required to efficiently carry and discharge the peak flow of the regulatory flood (100-year flood) of any river or stream. The second area is the remaining area of the floodplain, which is often referred to as "backwater." This "backwater" area is essentially a holding area providing storage of floodwater. One-hundred-year floodplains can be found along Elmer Seltontight Ditch, Heston Ditch, and Hoffman Ditch.

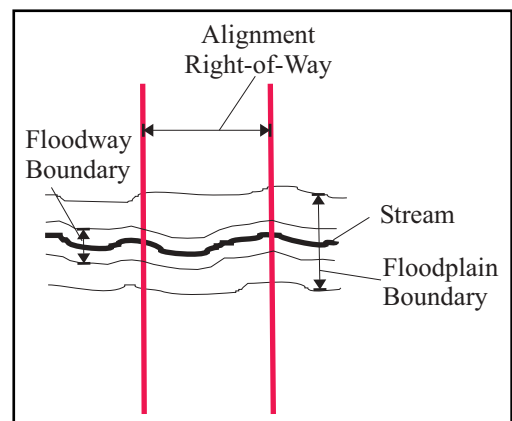


Figure 4.11.42: Floodplain Diagram



## 4.12 Wetlands

Wetlands are considered “waters of the U.S.” and are described in the *Corps of Engineers Wetland Delineation Manual* (1987). Wetland boundaries are delineated using three criteria: (1) hydrophytic vegetation; (2) hydric soils; and (3) wetland hydrology. For an area to be identified as a wetland, it must display all three of these criteria.

Wetlands cover about 813,000 acres (4-5 % of total area) of Indiana. Wetlands are an important natural resource because they support rich biological communities. Because of their functions and values, there are several federal and state laws that regulate activities that affect wetlands. The major laws protecting wetlands include the Federal Clean Water Act, the River and Harbors Act, and Indiana’s Flood Control Act.

Wetland ecosystems provide a transition zone from aquatic habitat to upland habitat. There are many different types of wetlands. The four types of wetlands identified from the National Wetlands Inventory (NWI) maps for the DEIS include emergent wetlands, scrub/shrub wetlands, forested wetlands, aquatic bed wetlands, and unconsolidated bottom wetlands. Wetland areas were calculated using NWI maps for the DEIS. Once a single preferred alternative has been selected, wetland areas will be delineated using the guidelines in the *Corps of Engineers Wetland Delineation Manual* (1987), and the amount of wetland acres impacted by the Single Preferred Alternative will be calculated.

Wetlands represent about 3.5% percent of Indiana; however, they harbor an unusually large concentration of our wildlife and plants. “For example, 900 species of wildlife in the United States require wetland habitats at some stage in their life cycle, with an even greater number using wetlands periodically. Representatives from almost all avian groups use wetlands to some extent and one-third of North American bird species rely directly on wetlands for some resource.” (Hammer, 1992)

Due to the diversity of habitats possible in these transition environments, the Nation’s wetlands are estimated to contain 190 species of amphibians, 270 species of birds, and over 5,000 species of plants. Many wetlands are identified as critical habitats under provisions of the Endangered Species Act, with 26% of the plants and 45% of the animals listed as threatened or endangered either directly or indirectly dependent on wetlands for survival. (Hammer, 1992)

Wetland, habitat, and trophic guilds were developed for all reasonable resident and migrant species occurring in Indiana based on a literature review and on field experience (Appendix G). This database of mammals, birds, reptiles, amphibians, and fishes occurring in Indiana includes a sample size of 606 species based on guild rankings. Of these 606 vertebrates, approximately 73% are fully or partially wetland dependent. In addition, 93 of 120 (78%) of the threatened and endangered species (TES) (including watch list species) are wetland dependent. Such high occurrences of TES species for wetlands show the value and importance of wetland habitats to Indiana’s biota.

Wetlands along riverbanks (riparian wetlands) are receiving more attention because of their valuable role in helping to stabilize banks. One of the benefits of riparian wetlands is that they act as natural flood control or buffering for downstream areas by slowing the flow of floodwater and reducing peak flows on main rivers. (Mitch and Gooselink, 1986)

Some wetlands may function as groundwater recharge areas, allowing water to seep slowly into and replenish underlying aquifers. Other wetlands represent discharge areas for surfacing groundwaters. Both may occur within close proximity depending upon local and regional patterns of ground water distribution. (Hammer, 1992) The following is a short description of different types of wetlands that were identified in this DEIS.

Generally, most wetlands systems within this project are categorized as palustrine, and thus not associated with a river or lake system, but rather dependent on groundwater or precipitation runoff to sustain their hydrologic regime. Many of the wetland impacts in this project are located north of Lakeville. Where possible, large wetland complexes were avoided or the impacts minimized by impacting only the edges of these complexes and not going directly through the

**Figure 4.12.43: Emergent****Figure 4.12.44: Scrub/Shrub****Figure 4.12.45: Forested**

core. For the most part, the wetlands impacted by the alternatives are small wetland complexes and are not high quality wetlands.

## **Emergent Wetlands**

Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. (Figure 4.12.43) Emergent wetlands are also known as marshes. The vegetation in emergent wetlands is present for most of the growing season in most years. (Cowardin, 1979) Emergent wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed. Bogs and fens are two of the high quality emergent wetlands that occur as thick peat deposits in old lake basins or as blankets across the landscape. (USGS, 1998) These two wetlands are primarily found in northern Indiana. Plants characteristic of emergent wetlands include soft-stem bulrush, carex, spikerush, and arrowhead.

## **Scrub/Shrub Wetlands**

Scrub/Shrub wetland areas are dominated by woody vegetation less than six meters (20 feet) tall. (Figure 4.12.44) The species include shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. (Cowardin, 1979) All water regimes, except subtidal are included. (USGS, 1998) Many of the scrub/shrub wetlands in the Midwest develop into forested wetlands. Plants characteristic of scrub/shrub wetlands include willows, button-bush, rose mallow, and spicebush.

## **Forested Wetlands**

Forested wetlands are wetlands that are characterized by woody vegetation that is six meters (20 feet) tall or taller. (Figure 4.12.45) Forested wetlands are the most common wetland type in Indiana where moisture is abundant particularly along rivers and streams. (Cowardin, 1979) Forested wetlands normally possess an upper canopy of trees, an understory of young trees and shrubs, and a herbaceous ground layer. (USGS, 1998) Plants characteristic of forested wetlands include silver maple, sycamore, cottonwood, and pin oak.

## **Aquatic Bed Wetlands**

Aquatic bed wetlands include wetlands and deepwater habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. (USGS, 1998) Aquatic bed wetlands make up only a small percentage of wetland impacts associated with the US 31 project.

## **Farmed Wetlands**

Farmed wetlands are wetlands that were drained, dredged, filled, leveled or otherwise manipulated before December 23, 1985, for the purpose of, or to have effect of, making the production of an agricultural commodity possible.





(USDA, 1994) These wetlands continue to meet hydric soil criteria, and have a 50% chance of being seasonally ponded or flooded for at least 15 consecutive days during the growing season, or 10% of the growing season, whichever is less, under normal conditions.

## Unconsolidated Bottom Wetlands

These wetlands include all wetlands and deepwater habitats that have at least 25% or greater cover of particulates smaller than stones, and a vegetative cover of less than 30%. (Cowardin, 1979) These areas usually have permanent water at least six feet deep or deeper most of the year and do not support hydrophytic vegetation. Ponds and lakes are examples of unconsolidated bottom wetlands.

## 4.13 Visual and Aesthetic Resources

Visual and aesthetic resources can be identified by examining the visual corridor of US 31. The visual corridor takes into account the entire landscape and, for purposes of the US 31 corridor, includes two main aspects: views to the road and views from the road. Views to the road include what is seen from an adjacent property when facing the roadway. These views are normally from a fixed vantage point, where as the visual corridor is viewed on a repetitive basis by drivers or pedestrians. Views from the road are experienced by roadway travelers, such as commuters, haulers, or tourists. As roadway travelers, these viewers have a broader exposure to the visual corridor. Such impacts are assessed to design quality, art, and architecture in the project planning. These values are particularly important for facilities in sensitive environmental settings.

The Indiana Department of Transportation has a policy to incorporate context sensitive solutions into the development, construction and maintenance process for improvements to the state jurisdictional transportation system (INDOT Design Memo No. 03-07). The establishment of context sensitive solutions incorporates accepted effective design practices. Context sensitive solutions allow ideas such as the preservation of historic places, scenic and natural environmental enhancement, and community values to be considered with the objectives of mobility, safety, and economics.

The following descriptions show the existing visual features for the area traversed by each alternative. The inventory of the visual corridor focused upon three key elements: (1) roadway; (2) land use; and (3) landscape. Information was gathered from driving each of the alternatives, their variations, and the use of GIS layers. Commentaries on each alternative begin in the south, near Plymouth, and end near US 20 in South Bend.

### 4.13.1 Existing Visual Corridor

#### Alternative Cs

Alternative Cs uses the existing US 31 Corridor for approximately 4.5 miles, and crosses flat topography. The corridor passes in or near the towns/cities of Plymouth, Harris, LaPaz, Lakeville, Colburn, Nutwood, Gilmer Park, and South Bend. The land use can be classified as a general mix of business, retail, commercial, and residential.

From US 31/US 30 Intersection to LaPaz, the Cs corridor land use is generally agricultural/grazing with some residential homes. (see Figure 4.13.46).



Figure 4.13.46: View from the Corridor



## **US 31 Plymouth to South Bend**

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From LaPaz to Lakeville, the corridor will pass on the east side of LaPaz, near LaPaz Junction. The visual corridor consists of agricultural/grazing lands, homes, and some wooded areas.

From Lakeville to South Bend, the corridor will pass on the west side of Lakeville and continue to the north. The land use is typified with many businesses along the corridor, with a mix of residential land use. The roadway will connect to US20 with an interchange.

### **Alternative G-C**

Alternative G-C uses the existing US31 Corridor for about 4.5 miles, and crosses flat topography. The corridor land use is a mix of agriculture/grazing lands.

From US 31/US 30 Intersection to LaPaz, the Cs corridor land use is generally agricultural/grazing with some homes.

From LaPaz to Lakeville, the corridor will pass on the east side of LaPaz, and near LaPaz Junction. The visual corridor is a mix of agricultural/grazing lands, homes, and some forested areas.

From Lakeville to South Bend, the corridor will pass on the east side of Lakeville and continue to the north. The visual corridor is a combination of land uses, such as wooded areas, agricultural/grazing fields, and residential areas in the form of subdivisions. As the corridor approaches South Bend, the land use changes to that of a mix of subdivisions, industrial use, and small ponds. The roadway will terminate at intersection of US20 where US31/US20 connects with an interchange.

### **Alternative Es**

Alternative Es uses the existing US 31 Corridor for about 4.5 miles, and crosses flat topography.

From US 31/US 30 Intersection to LaPaz, the corridor is comprised of agricultural/grazing lands, homes, forested areas, and businesses.

From LaPaz to Lakeville, the corridor will pass on the east side of LaPaz, and near LaPaz Junction. At approximately Tyler Road, the roadway turns towards the northeast. The visual corridor passes through agricultural/grazing lands, homes, forested areas and wetland area.

From Lakeville to South Bend, the corridor will pass on the west side of Lakeville and continue to the north paralleling the existing US 31. The visual corridor through this region is categorized by several large residential subdivisions; agricultural/grazing lands; a cemetery; and the commercial business district that includes businesses, gas stations, small shops, and a restaurant that parallel the corridor (see Figure 4.13.47). Just north of Madison Road the corridor roadway begins to turn towards the northeast. Through this area the land use is a mix of single-family dwellings and subdivisions, industrial activity, some small ponds, and forest areas. The corridor will use the US31 corridor until the termini at US 20.



Figure 4.13.47: View of the Corridor



## 4.14 Hazardous Material Sites

Hazardous materials are defined in the 1998 Indiana Code as a material or waste that has been determined to be hazardous or potentially hazardous to human health, to property, or the environment by:

- the United States:
  - Environmental Protection Agency;
  - Nuclear Regulatory Commission;
  - Department of Transportation; or
  - Occupational Safety and Health Administration; or
- the Solid Waste Management Board.

During the early development of transportation projects, the proposed rights-of-way undergo an investigation for the presence of hazardous waste. If found, attempts are made to have the sites cleaned up prior to the purchase of the property. Although it is desirable, hazardous materials cannot always be taken care of prior to the construction of a transportation project. It may be necessary to deal with known and/or unknown hazardous waste sites on purchased right-of-way during the construction phase.

Hazardous waste sites are defined in this analysis as properties that may require additional clean up of contaminated soils and/or the removal of hazardous materials. Early identification of these sites is important because additional work may be required to remediate these sites prior to any construction. This additional work can increase the cost of construction substantially, depending on the amount of contamination at these sites.

**RCRIS** stands for Resource Conservation and Recovery Information System and is provided by the Indiana Department of Environmental Management (IDEM). RCRIS is a national computerized management information system in support of the Resource Conservation and Recovery Act (RCRA). RCRA requires that generators, transporters, treaters, storers, and disposers of hazardous waste materials provide information concerning their activities to state environmental agencies. This database is used primarily to track handler permits or closure status, compliance with federal and state regulations, and cleanup activities.

**CERCLIS** stands for Comprehensive Environmental Response, Compensation, and Liability Information System, or Superfund, and is provided by the USEPA. CERCLIS is a national computerized management information system that automates entry, updating, and retrieval of data for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). It also tracks site and non-site specific Superfund data. It contains information on hazardous waste site assessment and remediation.

**Superfund** data were collected by the Federal Cleanup, Superfund, and NRDA section within the IDEM Office of Land Quality (OLQ). This database contains information that represents what had been recorded, processed, and archived by IDEM personnel at a time previous to this project. It contains information on hazardous waste site assessment and remediation.

The **Underground Storage Tank (UST)** program is responsible for registering all regulated USTs. This information was provided by IDEM. It assures that all regulated USTs meet Indiana's requirements for release detection, spill and overflow prevention, and corrosion protection, and to ensure that tanks not meeting those requirements are properly closed. The UST program assures that these protection systems are operated and maintained properly.

## **US 31 Plymouth to South Bend**

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Regulated USTs are those USTs that have 10% or more of the tank and piping buried beneath the ground and contain a regulated substance, which includes either petroleum products or hazardous substances.

**Leaking Underground Storage Tanks (LUSTs)** are defined as regulated USTs that contain regulated substances including petroleum and hazardous substances, such as those typically found at gasoline stations, fleet fueling facilities, and industrial sites and are suspected or confirmed of having a leak. This information was provided by IDEM.

The alternates in this project traverse predominantly through a rural landscape, which does not have large amounts of hazardous material sites except for a few isolated abandon landfills. The only area that had large concentrations of businesses and a probability for hazardous material sites was along US 31 south of US 20. This area had many commercial sites that included gas stations, carwashes, fast food restaurants, convenience stores, body shops, etc.